

**Customer Service Representative**

Telephone  
Microphone / Speaker

VOA Output Monitor

Hard Drive

Video Camera

Modem

MVA Camcorder

Keyboard

Mouse

IBM / STANDARD DUAL UP

**Music Vending Machine**

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# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US95/05464

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : G07F 11/00

US CL : 221/3, 7

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 221, 2, 3, 7, 9; 194/906

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US, A, 3,947,882 (Lightner) 30 March 1976 Note in Col 2, lines 19-28 a vending machine for audio or video tapes. A tape is duplicated from a computer and then dispensed.	1
Y	AU, A, WO 8907807 (Vogel) 24 August 1989 See the abstract for multi-uses of delivering additional products, as messages or visual accompaniments.	1



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:	*T	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*Z*	document member of the same patent family
*O* document referring to an oral disclosure, use, exhibition or other means		
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Date of the actual completion of the international search

13 JULY 1995

Date of mailing of the international search report

04 AUG 1995

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## MUSIC VENDING SYSTEM

FIELD OF THE INVENTION

The present invention relates to a video jukebox vending machine that also dispenses product. This computerized, 5 robotics-enhanced machine involves a standalone retail music store that is adapted to fit into areas of limited size.

This machine has the capability of not only playing music and music videos, but of allowing the user to purchase products directly from the machine with either cash, credit card or ATM 10 card and receive a printed confirmation/receipt. The user can not only purchase prerecorded and prepackaged musical product stored in the machine's inventory, but the machine also allows custom recording on various musical formats. Further, the vending machine permits the purchasing and dispensing of musical 15 appliances to play or listen to musical product and the energy sources necessary to operate those appliances. The invention carries the top selections in various musical categories in at least cassette tapes and compact discs: i.e., Pop, Country/Western, Urban/Rap and Rock and Roll/Metal. Each machine 20 and its selections can be customized and meet customer demands at each individual location.

The present invention also relates to a vending machine device in which an analog or digital telephone lines, with a single telephone call connection, provides the interaction between a user/customer from a remote location vending machine 5 and a central/host computer and customer service representative (CSR) or technical service representative (TSR).

The single line and the unique telephone board allows the transfer and switching between digital and analog of audio, video, and data. It further enables the central/host computer 10 the switching capability of communicating in either audio, video or data with the consumer on a single telephone line, with a single telephone call without hanging up the telephone and losing connection with the customer. This allows the CSR and customer to not only speak to each other directly over the telephone line, 15 but to view each other in both real time video and still image video. This also allows the CSR to send and control graphics, text and audio to the customer. While connected the present system, also allows the transfer and switching between the varies modes to effect the following functions: monitoring, security, 20 inventory, sales, accounting, diagnostics, alarm control, volume control, queue sequencing, graphics transfer, menu control, system analysis, playback, playback recording and playback storage capabilities, data storage and data transfer

capabilities, commercial insertion verification, video play log transaction, verification journal retrieval, income product log transaction journal retrieval, control of text and image output via a system printer, synchronization of audio to video or text, 5 automatic number identification, networking and local polling.

The company's proprietary, custom operating software allows the video screen on the vending machine to be the only source of menus of products and services available from or offered through (i.e., third party fulfillment - concert tickets, 10 flowers, etc.) the vending machine. This is accomplished by continually scrolling text over video of the machine's product and services. The scrolling text also indicates the keypad functions necessary to effect the customer's desired transaction. The machine also provides an automatic reduction of the real time 15 video image of both music videos, product commercials and graphics/text in order to promote utilization of portions of the video monitor dedicated to menus, instructions and prompts. The control and sequencing to the various mechanical functions of the machine including the dispensing of product via a single platen 20 on a x-y-z axis are custom designed.

BACKGROUND OF THE ART

With the increasing ease in which information can be communicated and stored in digital form, the entertainment industry is undergoing a revolution in how to distribute its products. Presently, the entertainment market provides customers with a variety of media, such as CD-ROM's, interactive TV, video networks, laser discs, on-line services, cassette tapes, and compact discs etc. However, the sales of most products, which is typically through music stores and computer stores, still remains primarily unchanged. With the increased mobility of buyers, the ability to effectively dispense products such as recorded music, as well as other products, is valuable -- particularly since many such purchases are made on the spur of the moment. Usually the desire for cassette tapes and/or compact disc occurs in places where a music store cannot be found, for example, when the buyer is located at an airport between flights and seeks music to overcome boredom.

To resolve these deficiencies, vending machines have been developed to increase the convenient access to products. To a large extent, however, those machines remain experimental and have not been found to provide an effective replacement to a music store. One problem with some vending machine designs is



their limited selection. To meet this issue, vending systems have been developed audio information can be remotely accessed and recorded in the vending machine itself.

For example Lightner, U.S. Patent Nos. 3,718,906 and 5 3,947,882 together describe a remote recording and vending system. However, Lightner's technology relates purely to recording and accessing cassettes, and fails to provide the user with a full array of other musical media, such as compact discs. In addition, Lightner fails to provide users with the ability to 10 review music videos, commercial advertisements, and picture telephone transmission along with audio interactive contact with the remote host. Moreover, Lightner fails to disclose any reference to the remote monitoring, controlling or security features of a vending machine.

15 Another shortcoming of current vending technology is the lack of a flexible communications architecture which allows the transfer of information that reflects the array of products sold by the vending machine, i.e. data such as audio, video and text as well as to provide voice communications between the vending 20 machine and the remote monitoring site.

For example, Sedam, et al., U.S. Patent No. 4,412,292, describes a system which remotely monitors vending machines.

This system is designed to receive, at a central location, information from vending machines which allows for their analyses and control. However, Sedam, et al. only provide for the interchange of electronic signals pertaining to sensor states, i.e., monitoring cash functions and inventory levels. Sedam et al., however, fails to provide a two-way communication between the remote units and the central control station. Instead all communications are only from the remote to the central unit. Moreover, this patent fails to suggest how to apply the communications functions to assist customers or provide data for capture into products. Other features lacking in Sedam et al. include audio/video simultaneously on the same phone line, alarm, diagnostics, security, print capability and voice communications.

Another example is Walker, U.S. Patent No. 4,845,636. Walker provides for a remote transaction system which is useful for conducting business transactions by providing visual contact between a buyer and a seller. However, Walker does not provide capabilities on a phone, but instead implements it on direct-cable links. Moreover, the cabling only allows for the transfer of video information. Also, Walker does not provide any diagnostic capabilities necessary for a full-fledged music distribution unit, including security, inventory control, sales monitoring, or providing video or audio data for custom recording

remotely at the vending machine. Also communications across analog and digital phone lines is not disclosed by Walker.

Thus, there is a need in the art for a vending machine device in which digital or analog-audio, and/or video information 5 can be recorded remotely and in which monitoring, audio communications and video communications, security, diagnostics, playback, inventory, sales and accounting features, alarm, security and print can be provided on a system interconnected via a telephone line to a host/central computer.

SUMMARY OF THE INVENTION

In view of the foregoing, therefore, there is a need in  
5 the art for providing a fully integrated musical vending  
capability whereby transaction monitoring and information  
dispensing, can be fully interactive between the vending machine  
and the customer service location. It is, therefore, a primary  
object of the invention to provide a music vending system  
10 whereby, as a result of the software and hardware communications  
design, the machine is capable of receiving digital video and/or  
audio data that can in turn be stored and used to record  
customer-designated music selections on recordable compact discs  
or cassette tapes as well as prerecorded and prepackaged musical  
15 selections.

It is another object of the invention to provide a  
vending machine data exchange capability which is monitored by  
computer. The computer also monitors the mechanical control, and  
product delivery functions of the vending machine. Control  
20 monitoring is accomplished locally at the vending machine and  
over a communications network. The vending machine also has  
self-diagnostics capabilities, a debit and credit card  
transaction feature and an automated product inventory control  
and accounting capability.

It is yet an additional object of the invention to provide a vending machine that displays music videos, audio-only samples, video advertising and live video/audio to customers and/or operators. The video information can also be randomly  
5 displayed and can be played in pre-set sequences, or can be randomly accessed out of sequence by vending machine users for a pre-set fee.

It is a further object of the invention to provide a vending machine whose menu selection, pricing information, and  
10 "how to" instructions can be readily changed remotely by computer modem, and accessed by the customer through a custom keypad design. Moreover, these menu, pricing and "how to" functions are presented in a graphical user interface which also displays entertainment, such as music videos and/or advertisements,  
15 simultaneously for the customer

~~It is another object of the invention to provide a vending machine system whereby the vending machine automatically senses when it is "out-of-stock," and automatically updates the menu selections for the user, based upon product availability.~~

20 It is yet an additional object of the invention to provide a remote transaction monitoring system where customer service representatives and operators can service, monitor and

assist customers by computer modem access from a remote monitoring site on a single phone with a single connection which when connected to the company is proprietary phone board, allows transfers of the multi-functional capabilities of the vending  
5 machine.

It is yet an additional object of this invention to provide vending machines which are capable of communicating with a central customer service location via telephone communications, including ISDN, T1 and standard analog protocol such that the  
10 vending machines can send and receive data simultaneously via high speed data transmission and such that real-time and still image video, data, audio and facsimile transmissions can be sent and received.

It is an additional object of this invention to provide  
15 mechanical and laser sensors that automatically determine the status of inventory and provide "out of stock" signals at the appropriate sensed level as well as the mechanical status of elements in the vending machine.

It is yet a further object of the invention to provide a  
20 vending system which uses analog or digital video technology to deliver still and real time video and permit file transfer and

playback of analog or digital real-time and still image information.

It is a further object of this invention to provide a mechanical product delivery system that can securely and reliably  
5 deliver product to customers based upon a single platen design delivery mechanism which is configured on an x,y,z motor arrangement in order to move product to a delivery point.

Briefly described, these and other objects of the invention are realized in its apparatus aspects by providing a  
10 vending machine comprising a communications means for switching between communicated data for display and output as either video, audio text or facsimile communications the latter of which are communicated to the user/operator on a thermal printer. The system further includes a transducer means for converting  
15 received data to an appropriate medium for dispensing product, a camera means for providing customer profile or surveillance video input to the communications means and a storage means for storing video data, audio data and technical information. The vending machine further includes means for checking inventory levels,  
20 approving currency and credit transactions and monitoring the mechanical status of the machine. The system also comprises a remote monitoring means for communicating with the vending

machine whereby remote monitoring can occur such that each vending machine's operational status and inventory level that can be monitored, is updated and supplied remotely by the communications means on a single telephone line with a single  
5 connection which utilizes a telephone switching board which allows the transport and transfer between audio, video and data.

These and further objects, features and advantages of the present invention will become apparent upon consideration of the following detailed description of the preferred embodiment  
10 thereof taken in conjunction with the accompanying drawings and detailed description.



BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a functional block diagram of a preferred embodiment of the present invention.

Fig. 2 is a functional block diagram of the audio source 5 switch 68 as shown in Fig. 1;

Fig. 3A is a software flow diagram showing the overall graphical user interface operation for the vending machine 30 shown on the SVGA output monitor 50 of Fig. 1;

Fig. 3B illustrates the graphical user interface as shown 10 in Fig. 3A;

Fig. 3C illustrates the display select video clip sequence shown in Fig. 3A;

Fig. 3D illustrates the end product display and help procedures illustrated in Fig. 3a;

15 Fig. 3E illustrates the process for releasing the product and assisting the customer for non-delivery as shown in Fig. 3A;

Fig. 4 is a frontal view of the keypad 72 shown in Fig. 1;

Fig. 5 is a schematic block diagram of the components of teleswitch 32 shown in Fig. 1;

Fig. 6 is a schematic frontal view of the machine 30 shown in Fig. 1;

5 Figs. 7A-7C show views of the rack and bin and a first drive arrangement for the vending machine 30 as shown in Fig. 1;

Figs. 8A-8C show front, side and bottom views respectively of the platen 708 shown in Figs 7A-7C;

Figs. 9A-9B illustrate different views of the platen 708  
10 shown in Figs. 7A-7C;

Figs. 10A-10C illustrate views of the bottom and sides of bin 710;

Figs. 11A-11D show front, side and top views of a second drive arrangement for the vending machine 30; and

15 Figs. 12A-12C illustrate the interaction between the platen and product delivery chute.

DESCRIPTION OF THE PREFERRED EMBODIMENTSA. The Control Computer 36

Referring specifically to Fig. 1 of the accompanying drawings wherein like reference numerals refer to like parts, 5 there is illustrated a system comprising one of a multiplicity of vending machines 30 which are connected to a common vending source 20 via telephone communications line 48. The telephone communications line 48 is adapted to support an integrated service digital network (ISDN) which provides a wide variety of 10 services including video, audio, text, and facsimile, data (both switched and non-switched in both circuit and packet-modes). Data is provided across the ISDN channels at a rate of 64 kb/s on the B channel (accompanied by timing). The ISDN of the present invention is supported on a public telephone network. However, 15 it can also be attached to a private branch exchange (PBX) or appropriate private network such as a local or wide area network (LAN or WAN respectively). For each vending machine, connection to the network is made via teleswitch 32 and modem 40 tied through a serial communications line to a control computer 36. 20 The teleswitch 32 is designed to appropriately switch and signal the data-type being applied across the public (or private) telephone line 48. A detailed description relating to the design

and manufacture of teleswitch 32 is provided with reference to Fig. 5.

In the preferred embodiment, the control computer 36 consists of, for example, an Intel 80-486 based microprocessor 5 having at least four megabytes of RAM (not shown), a removable floppy drive and at least an 80 megabyte IDE/SCSI hard drive 38. The microprocessor supports a multi RS-232 controller board standard and a Hayes standard AT-Command Set and Hayes Improved Escape Set with Guard Time compatible modem 40 with CCITT 10 V.42/CCITT V.42bis standard. The modem 40 is connected to the teleswitch 32 and to the control computer 36 through COM 2. A video capture board with an SVGA card 39 is also connected internally to the control computer 36. Other control cards include an NTSC, and PAL and a broadcast monitor. The control 15 computer 36 is further attached to a 14 inch SVGA monitor 50. Although a specific hardware configuration is described in this paragraph, any appropriate configuration can be used.

The arrangement of teleswitch 32 and modem 40 provides the capability of communicating digital information that supports 20 audio, text and video data transfer across the telephone lines 48. To support data communications, the vending machine 30 contains sufficient memory to buffer and store data in a

transparent manner. The database memory organization that enables a rapid read/write of data includes a semi-conductor memory cache (not shown) of sufficient size so that the hard drive 38 and the CD-ROM Drive 44 can be accessed with minimal delay. A description of the databases used by the vending machine 30 and the customer service station 20 (hereinafter "CSR") will be provided in further detail below.

#### B. The Databases

The vending machine 30 and CSR 20 share information across telco 48. This information is organized into four databases, which are stored at all vending sites and at the CSR. This redundancy permits full data security in the event of the breakdown of either the vending machines 30 or the CSR computer 10.

15 Specifically, each vending machine and CSR stores, in a first database address and identity data which informs the network of each machine's and host's identity. In addition, the vending machine communicates an automatic identification number to the CSR 20. Finally, that communication includes information 20 about each machine's status, location, and sales.

This first database, known as the machine database contains the following information: (i) the machine identification code, (ii) the machine location, (iii) the vendor identification, (iv) product sales figures, (v) the machine activation date, and (vi) the machine deactivation date. Each of these fields is discussed below.

The machine identification code (i) is an identification number or code which automatically identifies the machine. When a vending machine 30 communicates with the host computer 10 (to be described below) the host 10 is able to address the remote password which corresponds to the vending machine ID and which enables communication from the CSR site to the vending machine 30. The machine location field (ii) is an encoded value (such as an alphanumeric descriptor) which defines the placement or locale of the machine. Location is a valuable piece of information for the system administrator, franchisee, service operator, supplier or security service/police. From the standpoint of security, the location field obviously is valuable if the vending site has been robbed, or if the operator otherwise needs to contact police. From a repair standpoint, location is critical for notifying machine servicers of the machine's locale. Location is also important in order to differentiate machines that are placed in the same general area. Thus, if several vending machines 30 are

located at the same airport, shopping mall, or area of the city, the location data is valuable to differentiate one site from the other.

The vendor field (iii) identifies to the CSR who owns and 5 potentially services the vending machine. Vendor data is valuable from the standpoint of billing individual vendors for CSR services, notifying vendors of the problems with their machines, and providing inventory control. The machine sales field (iv) provides a total sales value figure representing all 10 cumulative sales for the identified vending machine 30 at the time that data is accessed. Finally, the activation date (v) and deactivation date fields (vi) respectively identify the date that each vending machine 30 was first put into service and the date that a vending machine was shut down. This information enables 15 the system to automatically identify and create log entries when vending machine calls to the CSR 20 occur. In addition, these fields enable the CSR site operator to separate help requests (to be discussed below) from alarm entries provided from the various sensors (to be discussed below as well). The log entries also 20 include information regarding the audio/video clips at the time the call is taken.

The second database is the vendor database. The fields in the vendor database are valuable since they provide reports pertaining to the sales for each vendor in order that the system manager can review and track how each vendor is doing. The data 5 for vendors includes accounting information, inventory control information and marketing information.

Specifically, the vendor database includes (i) a vendor identification number and (ii) region data for that vendor. The region data (ii) is particularly valuable from the standpoint of 10 licensing so as to avoid overlaps in the event that exclusive licenses are provided on a regional basis. The vendor database also includes (iii) the vendor's name, (iv) the vendor's address, (v) the vendor's city, (vi) the vendor's telephone number, (vii) the vendor's fax number and (viii) the total number of machines 15 owned and/or operated by the vendor. A total sales accounting value (ix) is also included so that updated sales data are automatically logged by the system. The inventory is also tracked vis-a-vis sales data for each vendor so that best selling item data (x) are stored in the vendor database. Thus, each 20 vendor can quickly ascertain what the hottest seller is so as to best predict inventory orders. Finally, the vendor longevity is tracked by a "vendor since" column (xi) and the vendor status is indicated in a vendor active or inactive field (xii).



The vendor database, when combined with the information in the machine database, can be used to create reports which integrate information from the various databases, sort that information by sort index given by the user, and provide reports 5 desired by any user. All data is supported by SQL.

A third database, the sales database, contains detailed information on products. The data includes (i) an internal number, (ii) the artist's name, (iii) the product title, (iv) record company name, (v) the record company title number, (vi) 10 the Bar Code Number, (vii) the media type (i.e., cassette tape, audio compact disc, CD-ROM, DAT, etc.). A tally (viii) of the total copies of that particular title sold to date for the last day, week, month and year or for any other period as defined by the system administration is also stored so an immediate 15 comparison of sales can be assessed. A best item number (ix) representing the number one best selling title is also maintained as a separate addressable item in the sales database.

Information retrieved from machines, stored at CSR, can be accessed by the record companies. The CSR can also provide 20 information to franchisees via a second computer. This provides record companies with instant access to information. Information

can be sent from the CSR by facsimile or through modem-based communications.

Activation dates and deactivation dates (x and x1) are also provided for longevity tracking purposes and to indicate when titles have been removed from the inventory.

The fourth database is the inventory database. This database contains files which link inventory to the title ID file contained in the sales database. The first file provides the (1) number of video files that are linked to the title ID. For 10 example, if a user wants to select a given compact disc, the inventory database will link that selection to a video file in order for the music video of the selected compact disc to be displayed on at least the SVGA or NTSC output monitor 50. Any appropriate monitor can be used, including a higher resolution 15 monitor or other monitor including other formats including PAL or SCAM. The video file can be read from CD ROM 54.

The above-discussed data is then loaded and played through the video pass-through board 37 such as a DVI board manufactured by Intel Corp. which is in turn connected to the 20 computer 36. The CD ROM information 44 is displayed through a SVGA monitor 50 and the audio selections are played through speakers 64 and 66. In addition to linking the video files for

playback, the inventory database also keeps an active inventory of the video files so that the vendor can readily link music videos with their audio inventory's changes, updates or modifications. Audio files (ii) are also linked to the title ID 5 field in order that the vendor can track the number of inventory audio files for a given work's title. In addition, the total amount of inventory contained in the vending machine (iii) is provided. This value, unlike the audio files field, provides a total picture of all inventory, independent of media type for a 10 given title. Hence, if the machine stores CD ROMS, audio cassettes, compact discs, and music videos, among other things, the vendor will have an overall picture of overlaps and redundancies for different media types for a given title.

The inventory database is linked to a CSR-based viewing 15 program so that the CSR operator can view real-time audio and video clips of the titles through the CSR computer 10.

Finally, the inventory database, contains a help caller log (iv). The help caller log (iv) tracks all communications between the CSR site 20 and the vending machine 30. All log 20 entries can include audio and video clips taken at the time of the call. For example, if a call is made by a customer, the video camera 42 can send to the CSR site 20 a video picture of

the customer/service personnel querying for help. Similarly, video data provided from video camera 14 at the CSR site 20 can transmit a video response so that a picture-phone type image is employed to help the caller/operator. These digital/audio 5 communications can be stored and logged for later review.

C. Peripherals To Computer 36

In order to promote the multimedia aspects of communications between the user/operator and the vending machine 30, as well as between the vending machine 30 and the CSR 10 site 20, a variety of other data sources are connected to the control computer 36. In addition, the control computer contains a digital video interactive board 37 (DVI). The DVI board 37 delivers still and real-time video information to the computer which then converts that information so that it can be provided 15 to the video monitor 50. This technology thus permits the recording, file transfer and playback of digital real-time video. The video input for the DVI 37 can be provided either through the cameras 14 and 42 or stored from other sources, from the laser disc player 46, or from the player-recorder 55.

20 As noted previously, a number of peripherals are connected to the computer 36 for a variety of purposes. Those peripherals include a card reader 52 which is used to read and

process information from magnetic or optical credit cards, ATM cards, or any other cards that are used for such transactions, etc. In practice, after a customer slides the card through card reader 52, that information is saved in the sales database. Once  
5 verification is received from a credit card service bureau which is connected via modem to the vending machine computer 10 (credit service bureau linkage not shown), the product is released by the vending computer 74 which receives the authorization information and order data from the computer 36.

10 As discussed, a Sony 8mm player recorder, or another appropriate 8mm device 55 is connected to the control computer 36. Preferably the player/recorder has VISCA control capabilities. The player/recorder 55 is designed to hold up to  
15 two hours of pre-recorded music videos that are sequenced in a specific order. The 8mm unit 55 is controlled by computer 36 in order to play back a preselected arrangement of music videos to an end-user.

A cassette recorder 54 is also connected to the computer 36 although the cassette recorder 54 can be independently  
20 connected to the audio source switch 68 into the speakers 64 and 66. A cassette recorder 54 is designed to both record and play back cassettes for play back during use of the machine. The

other peripherals include a compact disc recorder player 56 and a dual-sided laser disc player 46. These peripherals are also used, as will be described below, to provide communications to the end user through SVGA output monitor 53 and speakers 64 and 5 66.

The vending computer 74 operates in close conjunction with the computer 36. The vending computer 74 is designed to provide communications, via the computer 36, pertaining to the status of inventory, the delivery of that inventory, the power 10 supply status, the status of mechanical operations and interactions with the user through key pad 72 and the currency (bill) acceptor 70.

In the preferred embodiment, the vending computer 74 comprises an Intel 80-186 microprocessor. However, a more 15 powerful microprocessor, such as the 286 through the 486 series Intel microprocessors, can be substituted. The vending computer 74 is connected to a key pad 72. Details concerning key pad 72 are shown in Figure 4.

#### D. Keypad

20 Referring to Figure 4, the key pad 72 comprises a series of function keys 410 and a plurality of numeric keys 420. The

enable a user to select a media type such as by pressing key 422 for a compact disc, key 423 for a cassette tape, key 424 for a music video, key 425 for a cassette player or key 426 for 5 cassette batteries.

The order entry is submitted to vending computer 74 by pressing the "enter" key 430 and the order cancellation is accomplished by pressing key 432. The instruction key 440 is designed so that a user can seek, and receive instructions, from 10 the CSR system 20 in conjunction with help software from computer 36 in order to assist that user in ordering a product. The numeric keys 420 are used to order the particular item or request a particular video by identifying its item code. The keys can also serve in assisting the user with credit card and 15 cash transactions.

The help key 450 provides several unique functions. First, the help button automatically connects the operator/user to the CSR operator in order to answer questions to the CSR operator or CSR computer 10 directly. The customer presses the 20 help button 450 which initiates a telephone call through computer 36 and Teleswitch 32 across telco 48. A telephone 20 is connected in turn through teleswitch 32 to the microphone speaker

24 adjacent to the CSR representative at CSR site 20. The CSR operator listens to the request and presses a touch-tone button on the CSR telephon at CSR sit 20 to switch to a data mode of communication to access computer 36 for machine inventory and 5 system status. The CSR operator then has the first option of viewing a still frame or real time video picture of the customer taken by a video camera 42 which is viewed by the CSR operator through the SVGA output monitor 12. The CSR operator can press a touch-tone button 18 to return to a voice mode or the operator 10 can terminate the telephone call altogether.

Another feature of the help button is that it initiates refunding transactions between the CSR and the customer. Furthermore, by activating the help button, the system can inform the CSR that the customer has received a wrong product so that 15 he/she can receive a refund. The help button also assists the customer in selecting a product when he/she inserts currency and does not receive a product.

Returning now to Fig. 1, the computer also operates in conjunction with the bill acceptor 70. Specifically, the 20 computer 74 contains standard hardware and software for receiving currency and providing change for such currency to the end user. In addition, a whisker switch sensor product door 78 and a



whisker switch sensor out-of-product sensor 76 is provided. Details concerning the sensors will be discussed below. The system also includes the power supply 80.

#### E. Teleswitch

5           Figure 2 represents a block diagram illustration showing the components comprising the audio source 68 which is shown in Figure 1. In particular, the audio source switch (shown by the dotted line) consists of a relay board 202. The relay board 202 is connected to three sources of audio information: the  
10 telephone board 32, the video recorder 55, and the internal audio source located on the microprocessor 36. Additionally, the PC internal audio source can receive audio information from other destinations, including any external IBM-compatible computer 206 along with the various memory drives associated with the computer  
15 36, e.g. the hard drive 38, the CD-ROM drive 44, or the video camera 42. The jack and the internal audio source are connected through an RCA audio line 208 to the audio source or switch relay  
202. In addition, the telephone board 32 provides a communications link to the switch relay board 202. The telephone  
20 board, as previously described, receives and sends audio communications to the CSR Site along with other addresses located

on the telephone line 48 (other vending machines, external antenna, wide area network, or local area network, etc.).

All audio communications are transferred through the CPU 36 to the relay. The relay is activated by signals sent across 5 the respective lines 210 or 208. While activated, the audio information is converted from digital to analog form, amplified by an amplifier 204 and provided as a speaker output to the set of stereo speakers 64/66. Although not shown, the audio amplifier can have other outputs provided to externally-mounted 10 speakers, or to other means which can communicate the amplified audio signal (e.g., antenna, transmitter).

#### F. GUI Operations

Figure 3A illustrates a flow chart of the operations of the graphical user interface main algorithm 300. In particular, 15 at step 302, the machine status is initially checked to determine if the machine is available for power-up. If a self-diagnostic check indicates that it is, then the power-on condition occurs and a power-on status is communicated to the computer 36 across telco 48. The status is also provided to the CSR computer 10. 20 On power-up, the machine enters the idle/default mode 304.

The default mode is designed to provide base-line entertainment throughout unless the customer purchases a music video for direct view. As designed presently, the machine plays music clips and/or video music selections interspersed with  
5 advertising made in a predetermined continuous loop. These played images are displayed across 100% of the SVGA monitor 50. A scroll menu is also seen on the monitor allowing the customer to make an initiation keystroke. Play occurs through the Sony 8MM Player Recorder 55, and the sequencing of that data recorder  
10 is controlled by the computer 36. Periodically, the computer 36 tests the keypad 72 in order to determine whether or not a selection key is actually made at step 308. If not, the loop continues at step 304 to the next periodic test.

In the event that a selection key is activated, a menu  
15 and price list are first displayed to the user so that the user can select a music video, a compact disc, a cassette, or another selection such as a cassette player, headphones or batteries. At this point, the video player continues to entertain the customer. However, the display of the video sequence is reduced to 75% of  
20 the monitor in order to accommodate the selection and price menus. If no selection is made within, for example, sixty seconds, (although anytime period can be programmed) of the last

keystroke, the system loops back automatically to default mode 304.

Once a selection is made by the user 312, a time-out for 30 seconds (or any other time period) occurs in the event the operator wishes to cancel his or her transaction. A selection test is then made at Step 312 to determine whether or not the selection is valid. If the selection is not valid, the machine provides an appropriate message or an invalid selection message and returns to the default mode. By the same token, if the selection is incomplete, the default Mode 304 is re-entered.

In the event that a valid transaction does occur, then the credit card or cash transaction is processed at step 314. For credit card or debit card transactions, the information from the card is read from the card reader 52. The read information is then stored in an appropriate memory of computer 36. The credit card information is then sent, on a high-priority basis, through the modem 40 across telcom 48 to the appropriate credit card/debit card approval network. While the credit/cash transaction is ongoing, the video display remains on the monitor. However, the video display only occurs on 25% of the entire monitor. Other functions in Step 314 will be described in further detail with reference to Figures 3B through 3D.

Once the money has been accepted, the system then enters Step 316 where the choice is communicated to the user. The mechanical operations are then activated so that the product is delivered to the customer. The computer 36 and computer 74 then immediately update inventory stored in memories 38 in order to indicate the sale of one item, and the identity of the item. During ordering and delivery, the help button is monitored in order that transaction problems can be immediately addressed by the vending machine directly, or by the CSR site. Details concerning the help operations will be discussed below.

While the transaction occurs, the help button is tested at Step 318. If the help button is activated, then at Step 320, help processing occurs, as we describe in further detail below in Figure 3B and 3E.

15 If the help button is not activated or the help procedure is completed, then the system defaults at Step 310 to the default Mode 304.

Figure 3B is a flow chart that describes, in further detail, Step 302 discussed above with reference to Figure 3A. As shown, the system runs initial tests to determine whether or not the vending machine is connected and is in proper condition for power-up. Tests run by the system include the CSR computer 10,

testing the teleswitch 32, the computer 36, and the vending  
computer 74. Control tests include an inventory review to  
determine discrepancies, a check of major software routines to  
determine if they execute properly, power supply tests, a test  
5 run of all sensors to determine whether or not they operate  
properly, and communications tests across the telephone and  
communications network. Protocols, handshakes and data  
transmissions are also tested. Those tests can include, but are  
not limited to: testing the status of all peripherals, parity  
10 code data checks of the memories, etc.

Once the control tests are completed, the status of the  
system is maintained in a system log 326. The system log status  
is communicated to the CSR Site for storage in CSR memory 6. The  
system is then tested to see whether the tests at steps 322-326  
15 have been passed. If so, then the system status is changed to  
"green", which indicates the ability to power-on vending machine.

If the test at step 328 indicates a test that has been failed,  
then the system automatically tries to connect to the CSR site 20  
at step 330. Once communications are established with the CSR  
20 Site 330, diagnosis and corrections to the machine can occur  
remotely. This occurs through intervention by the CSR Site  
computer operator who can remotely test the systems or  
automatically by the CSR computer 10 or vending machine computer

36. If remote diagnostics do not correct the issue, then an operator can be call d to replace needed components.

Figure 3D represents the details regarding the order mode presented by Steps 306 - 314, in addition to the help button 5 tests in step 318. The order sequence is entered once the default mode is exited at step 304, by virtue of the user selecting a purchase option from the keypad 52. At step 360, a determination is made whether or not the selection key has been pressed, if not, then after 30 seconds, the system returns to the 10 default mode 304 at step 364. The selection test then occurs again after the menu choices are displayed at step 362. If the test indicates the button has not been activated, the default mode is then entered. However, if the selection is entered, then at step 366, the method of payment routine is selected. If the 15 actual payment is not received within 30 seconds, then the system defaults to default mode 304.

Figure 3C is a flow chart illustrating the operations of the default mode 304, as shown in the flow chart in Fig. 3A. The default mode is entered upon power-up with the machine in step 20 302. Once entered, the default mode first plays a 30-second commercial and video clip 340. During this period, the keypad 72 is tested at step 342 to determine if any of the scroll menu keys

have been pressed. If the test 342 indicates activation of the keypad, then the default mode status is updated so that the computer saves the location of the next video clip to be played in the event a music video is selected to be played out of the 5 predetermined sequence at step 346. The system then enters the ordering sequence, which is represented by steps 306-318 in Fig. 3A. In the event that no menu keys are pressed, then the next video clip/commercial is played at step 344.

Fig. 3D represents the order mode represented by steps 10 306-314 and the help button tests represented by step 318 in Fig. 3A. The order sequence is entered once the default mode is exited at step 304 by virtue of the user selecting a purchase option from the keypad 72. At step 360, a determination is made whether or not the selection key has been pressed. If it has 15 not, then after 30 second, the system returns to the default mode 304 at step 364. The selection test then occurs again after the menu choices are displayed at step 362. If this test indicates the button has not been activated, then the default mode is entered. However, if the selection is entered, then at step 366, 20 the method of payment routine is selected. If the actual payment is not received within 30 seconds, then the system defaults to the default mode 304.



In the event that both the bill acceptor and the credit card acceptor indicate they are receiving payment, then the system activates the help mode which switches the system to the teleswitch capability. This capability allows the CSR site 20 to 5 determine whether or not the right amount of cash has been received to verify reception of cash. In addition, the CSR computer 10 can determine whether the credit card or debit card has been entered, whether the customer pin number is correct, and whether a valid charge-accept condition is provided by the 10 external credit card service bureau computer to the vending site 30. Once the credit/cash operations indicate that the right amount has been received, or verification has been made on the transaction, then the product delivery sequence 316 is activated at Step 380. In the event that the transaction amounts for 15 verification are not received, the system loops back to step 381 to accept additional cash, or to indicate to the user that there is need for her/him to re-enter the credit card.

Step 316 and the help button step are also shown in Figure 3E. Operations of step 316 include, step 382, in which 20 the control computer 36 notifies the vending computer 74 that it can release the product once the signals are provided to the computer 74. The stepper-motor interface 91 as shown in Figure 1 is then activated and the stepper-motors 92, 93 and 94 are

directed to move the product platen (which will be shown in further details below), to retrieve the product for dispensing to the customer. The product delivery occurs by virtue of the x-y-z mechanism which moves in three coordinate planes to select, 5 receive, and deliver the product, and then convey that product to the delivery door. A sensor is located at the site of the door so that upon receipt of the product in the product bin of the delivery door, a delivery complete signal is sent to vending computer 74. Reception of that signal is tested periodically by 10 the communications and control computer 36 at Step 384.

Once the delivery completion step has been indicated at step 388, the help button is monitored to determine whether or not an incorrect delivery or problem in delivery has occurred. If no help button has been activated, then at step 388, the 15 default mode 304 is returned to. In addition, the transaction log is updated by the control computer 36 to indicate a change in inventory, a delivery of product and/or a complete transaction. While delivery is ongoing, the help button is routinely monitored at Step 386. If the help button has been pressed, then an 20 immediate call to the CSR site occurs at step 390. If not, the help button is monitored until the time of delivery for three minutes after. The system then times out.

### G. System Operations

In view of the arrangement of the operations and architecture of this system described above, the typical and abnormal operation of the system will be described below in 5 further detail.

In a normal operating sequence, a customer walks up to the vending machine and watches video clips, or commercials, and doesn't buy anything. This takes place during the machine's default mode 304. In the event that the customer wants to use 10 the machine, for example, to select a compact disc product this selection is displayed at step 306 and the user then pays and receives the product. The new customer can use the machine to select an audio cassette or a cassette player with headphones or batteries. As another option, the customer can merely use the 15 vending machine as an entertainment device which plays music videos. As previously noted, those music videos can either be played in a predetermined sequence, or can be individually selected by the user to play out of sequence. The operational sequence is the same as above except step 316, does not occur. 20 Instead, the Sony 8MM player/recorder 52 is activated to automatically fast-forward or rewind to the beginning of the music video for play. Alternatively, the sequence of music

videos is not altered by virtue of a selection out of sequence. In this event, the system returns to the next video in the loop for playback. One of the above operations can also occur with the use of a credit card.

5           A further product purchase scenario occurs when the customer walks up to the music vending machine and watches how to use the machine promotion, along with advertising. The customer may then select a product, such as a compact disc, whereupon a menu of choices of available compact disc titles are provided on  
10 the SVGA monitor 50. A customer then enters the desired disc number on keypad 72 that he or she has selected to buy. Once selected, the customer is prompted for a payment type. If the customer inserts money, the customer is constantly prompted until the correct amount has been received. If change is needed, the  
15 machine can provide it. Once the change has been received, the customer is told by the monitor to stand by and the products are delivered. The machine then automatically logs the transaction. During this entire transaction, the sequence of video clips. commercials continue to play without interruption.

20           A similar operation occurs if the purchase is made by credit card. In this event, the customer elects a credit card method of payment on the keypad. He or she is then prompted to

swipe the card through the cardreader 52. Once the swipe is read, the customer is then told that the credit card transaction is waiting for approval. A standby message is thus sent on the monitor 50 while the transaction verification approval process 5 occurs. Once complete, product delivery sequences are initiated by the vending computer 74 and the control computer 36 logs the transaction.

With respect to abnormal operations, a customer can select a product, insert currency, and receive the wrong product. 10 If that occurs, then a customer is prompted by a message on monitor 50 to select the help button. The help button will provide the customer with the possibility of a refund authorization. There is also the possibility that the customer will select a product and insert currency and not receive any 15 product. In this case, the customer can also press the help button which will contact the CSR Site and which will cause the CSR site operator to provide an authorization for a refund to the customer's credit card. However, in the event that the customer pays by cash, and presses the help button, the system only gives 20 the option of selecting a different product. In this event, a refund will be obtained by mail and a receipt will be provided by the vending machine indicating this.

Finally, in the event that the customer selects a product, doesn't receive the product, and is not able to operate help button, a help condition will automatically be generated by the vending machine which will cause CSR operator to communicate 5 with the user through the speaker-microphone and/or SVGA monitor. In addition, such communications include a picture of video of the CSR operator's face for the customer on monitor 50. In the event that the user simply forgets to activate an otherwise functional help button, the system will generate an automatic 10 "help" signal at 80 seconds after non-delivery of the product to the user. A non-delivery time-out is 90 seconds from the time the order entry key is depressed or payment was approved (whichever is later).

Another fault condition occurs when a physical disconnect 15 between telco 48 and the music vending machine 30 occurs. The system also includes tilt sensors 82, and teleservice sensor 84, which when activated, indicates a communications break or movement in the vending machine 30. The power service alarm 86 also incorporates a sensor which, when the power is lost or 20 interrupted, immediately sends an alarm to the CSR site 20.

Other abnormal operating conditions can be resolved by to the CSR representative. If the customer presses a help button

when the product is not delivered, the customer service representative will answer the telephone call through the speaker microphones, and the SVGA monitor will provide video phone communications. When communications are initiated, the CSR site  
5 can request, and then press, a touch tone button to switch to a data mode so as to access the vending machine 30. This access can also be initiated by the CSR representative in order to determine the status of the machine and its inventory. In addition, the CSR operator has the option of viewing still frame  
10 or real time video pictures of the customer at the site and pressing the touch tone button in order to return to a voice mode. The CSR operator can also remotely trigger the vending machine 30 to deliver the product to a customer while on line, and then update the database record of the incident for future  
15 reference. The franchisee can also be notified by the CSR representative in order to provide that franchisee information about when and where delivery failure occurs so that the franchisee can pinpoint and service problems with the machine.

In certain situations, the CSR site cannot remotely  
20 activate the vending machine 30 and deliver product. In this situation, the CSR operator can offer a customer a refund option either by mail or by printing credit refund at the machine site. The mail refund would involve a currency refund i.e., a check



sent to the customer. A machine refund could be a credit authorized through the customer's credit card number although debit card or other conventional CAT, ATM type refunds can occur.

The CSR is also valuable with respect to responding to 5 alarm conditions. For example, if the telephone line 48 is disconnected, an internal alarm is sounded at the vending machine 30. When telephone service is restored, the franchisee is then automatically called by the CSR computer 10 regarding the problem. Once an operator has re-connected the telephone line, 10 the machine automatically calls the CSR to reset the alarm via DTMF communications.

The tilt alarm also operates in a similar manner. If an unauthorized person tilts or moves the vending machine and the tilt sensor switch picks up the shift, the vending machine, 15 through computer 36, automatically calls the CSR and sends a pre-identified DTMF code. The CSR operator then has the option of viewing still frame or real-time video pictures provided by video camera 42 those activities at the vending machine 30. The operator then has a variety of options which he/she can take 20 including shutting off the alarm, calling the franchisee, calling the landlord's personnel, calling a security service, no action



at all, dealing with the person at the machine, hanging up, reconnecting with machine, etc. security service.

Figure 5 illustrates details relating to the teleswitch and telephone board arrangement 32 which is a unique custom configuration. As shown by the dotted lines, the teleswitch 32 is connected to the telephone board computer 510 as well as to a speakerphone device 502. The teleswitch unit includes a dual tone modulated frequency unit 504 which is adapted to receive control signals from the computer 510. The teleswitch is designed to intelligently switch between voice and graphics, text and video (real time and still image) and any other data communications. A DTMF device 503 is controlled to operate in two modes by the computer 510. The first mode, known as on-line, is the transmission mode and the second mode, known as off-line, involves voice transmissions.

A control unit 506 receives digital signals from the line interface and amplifies those signals to the relay 508. The relay, in turn, switches communications to the CSR sight. In the event that data is to be transmitted, an RS-232 device 512 provides an interface for effecting data communications to and from control computer 510. As a consequence, the telephone switch device is designed to automatically switch between voice

and data. This telephone board is powered by a 12-volt direct current power supply and is connected to a modem. The computer modem connection is then established via the telephone network between two computer modems when both are switched to voice mode. 5 Voice communication results switch back to a data mode by pressing a touch-tone button on a telephone. A standard telephone pad is connected by the RJ11 connector to the modem. The telephone switch receives the touch-tone DTMF signal and the modem goes on-line reestablishing a carrier signal.

10 H. Mechanical Arrangement

Fig. 6 is an overall frontal view of the external appearance of the music vending machine according to a preferred embodiment of this invention. In particular, frontal diagrammatic view of the outer appearance of the machine 30 is 15 shown. Elements located internally to the machine are shown by dotted lines. The internal elements include a teleswitch 32, a control computer 36, a vending computer 74, a first part of power supply 80, a stepper motor interface 91 and a second part of power supply 80. Additionally, the bill acceptor 70, the video 20 tape player/recorder 55, the audio source switch 68, the credit card reader 52, the external speaker microphones 64, 66 and the video camera 42 are illustrated. The construction of the outer

cabinet includes a front door 604. The door is designed so as to substantially cover the frame including the x,y,z stepper motor arrangement 602. However, the doors can be extended along dotted lines 606 and 607 so as to open the entire front of the cabinet 5 from top-to-bottom. The SVGA output monitor 50 is located centrally between the two doors at the upper end of the cabinet to provide easy viewing of the music videos.

Figs. 7A-7C illustrate front and side cut-away views of or first arrangement of the vending machine rack design, 10 platen-product server and shelf configurations. In particular, Fig. 7A is a left side view. Fig. 7B is a frontal view of the machine, and Fig. 7C is a left side view of the vending machine 30. As shown, the vending machine 30 consist of two sections: the first section 730 contains the communications hardware such 15 as the monitor 50, the speakers 64 and 66 and the camera 42. The second section 740 contains the product storage area 700 and delivery system. The storage system 700 consists of racks of shelves 702 which are arranged in rows. Each shelf contains an array of bins 710, 712 and 714 as shown in Fig. 7C. Each bin in 20 turn contains a column of the product to be dispensed. Each row of bins, in the illustrated embodiment, is three bins deep and six bins wide, although any number of bins can be employed. Moreover, each bin is designed to be a different height going

from the front plane 716 of the machine 30 to the back of the machine 718. The front bin 714 is a first short height, the second bin 712 is at a second middle height, and the third bin 710 is at a third height. As a consequence, the bins going from front to back are staggered in height in order to enable a delivery platen (not shown) to remove product from the back-most bin 710 without being obstructed by bins 712, 714. By staggering the bin depths, minimal adjustments to the platen path of movement are necessary.

10           Each rack of shelves 702 is mounted on roller bearing tracks (not shown). This design allows the entire rack 702 to be easily pulled out and pushed back out of and into the vending machine 30. Thus, during servicing or supplying, a service operator can readily restock the machine 30: e.g., first, he  
15 opens the front doors 604 (Fig. 6). Then he rolls out an entire rack 702 comprising multiple rows of bins 710, 712 and 714. He may then remove either the entire rack 702, a row of bins 710-714 or individual bins.

For example, if the bins are individually mounted on the  
20 rack for easy removal, then each bin filled with product can be placed in the position of the removed bin. The same scenario can be applied to the row of bins, or an entire rack. Mounting

arrangements for the bins, rows and racks are described in more detail below.

The product delivery system shown in Figs. 7A-7C comprises several conveyors 720 arranged below each rack 702. The conveyors are arranged below each rack so that product can come off each bin (by virtue of an appropriate movable base assembly (not shown)), onto the conveyor whereupon the product is transported to a respective delivery door 750.

Referring now to Figs. 8A-8C a second delivery means, consisting of platen 708 is shown. In particular, Fig. 8A is a top view of the platen 708. The platen 708 consists of a flat delivery surface 820. At one end of the platen 708 is pin 802 which is used for removing the product from a bin 710-714. The pin 802 extends substantially vertically above the plane of delivery surface 820 so that when the platen 708 is aligned below and surface 820 is substantially horizontal to the bottom of a bin 710, 712 or 714, the pin 802 is adapted to engage with an edge of the product so that upon transverse movement of the platen relative to the bin, an edge of the product engages pin 802. As a consequence, movement of the platen along a horizontal (Z axis) causes the product to slide out of the bin and rest on the platen surface 820.

At an opposite side of the platen 708 from pin 802 are a pair of pins 804 which extend perpendicularly to respective sides of platen 708. The pins are respectively located adjacent a pivot point 806. As will be described below, the pins 804 are designed to engage with a delivery chute (not shown) having a pair of notches designed to cooperate with each of the pins separately such that upon vertical movement of the platen (along the Y axis) the platen pivots along arrows 830. As a result, the product slides off of the surface of the platen into the delivery chute.

The platen 708 includes slides 810 when enable it to slide transversely along the X axis. Movement along the x,y,z axes will be described in further detail below with reference to Fig. 12. The slides 810 are adapted to move the minimal friction along a pair of slide bars mounted on an x,y,z frame. Movement is controlled by an x motor (not shown) which through an appropriate pulley arrangement, is attached to platen 708 through a cable so that the cable, when pulled in a first direction causes the platen to slide in that same direction. The x axis stepper motor then operates in a second direction which causes the platen 708 to slide in that second direction.

Figs. 9A and 9B show a front view (9A) and a top view (9B) of the platen 708. No additional description of the platen is needed.

Figs. 10A-10B respectively illustrate bottom, back and side views of the bins (710-714). In Fig. 10A, the bottom of the bin 710 is shown mainly consisting of two retainer shelves 1004 and 1006. Each shelf is designed to hold a portion of product 1010 which is stacked above the shelves 1004, 1006. A channel 1002 is defined between the shelves 1004 and 1006 so that a bottom portion of the product 1010 is exposed. In addition, a notch 1014, shown in Fig. 10B, is located along a back side 1016 of the bin 710. The arrangement of the channel 1002 and notch 1014 thus provides sufficient clearance in order for the pin 802 to extend upward through the notch 802, engage a side of product 1010, and slide the product along the direction indicated by arrow A (Fig. 10A) off the bin 710. The back 1016 of bin 710 also includes finger hole 1020. This hole 1020 enables an operator to view the product supply, realign the product and easily view the supply needs for that bin. The top 1021 of the bin 710 also includes a pair of tabs 1022 which are adapted to engage with a top surface of rack 702 (not shown) so that the bin is held in place on the rack, but may also be easily removed by lifting the bin 710 substantially along its vertical axis.



Fig. 10C is a side view of bin 710 which illustrates that the bin mounted at an angle. In other words, the front of bin 1030 is raised at an angle above the back of the bin 1016. As a consequence, the probability that more than one product 1010 will slide off the bin 710 is reduced, since the bin is raised at an angle required to keep the product from sliding out of the bin by accident.

Figs. 11A-11C illustrate the x,y,z frame 1100 representing an alternative arrangement for conveying product 1010. The Y axis comprises a pair of vertically mounted frames, each having a Y axis stepper motor 1130, 1132 as well as screw driver mechanism (not shown). The Z axis arrangement 1106 is shown in Fig. 11D. The Z axis also includes a pair of screw feed elements 1134 on each side of machine 30 to enable stable movement of the platen 708 mounted thereon. The Z axis assembly includes a drive motor 1140 mounted to move platen 708. Finally, the X axis drive arrangement is best seen in Figs. 11B and 11C which show platen 708 mounted on a pair of bars 1150 and 1152. The bars 1150, 1152 are mounted to engage platen 708 through slides 810 as previously described. The Z axis 1106 screw feeds 1134 are adapted to engage bars 1150, 1152 through an appropriate mounting in order to move the bars 1150, 1152 along their Z axis.



Additionally, the mounting engages bars 1102 of the Y axis to move along the axis as well.

Figs. 12A-12C respectively show the platen 708 positions vis-a-vis the delivery chute 1210 (12A and 12B) and a front view 5 of the delivery chute 1210.

While the invention has been particularly shown and described with reference to the preferred embodiments thereof, it will be understood by those skilled in the art that various changes in forms, details and applications can be made without 10 departing from the spirit and scope of the invention.

WHAT IS CLAIMED IS:

1. A vending system, comprising:

a host unit having a host computer;

a vending unit having a vending computer;

5 a communications means which enables the transfer of product, video, telephone, facsimile and voice data between said host computer and said vending computer; and

delivery means for delivering said communicated product that transferred from said host computer.

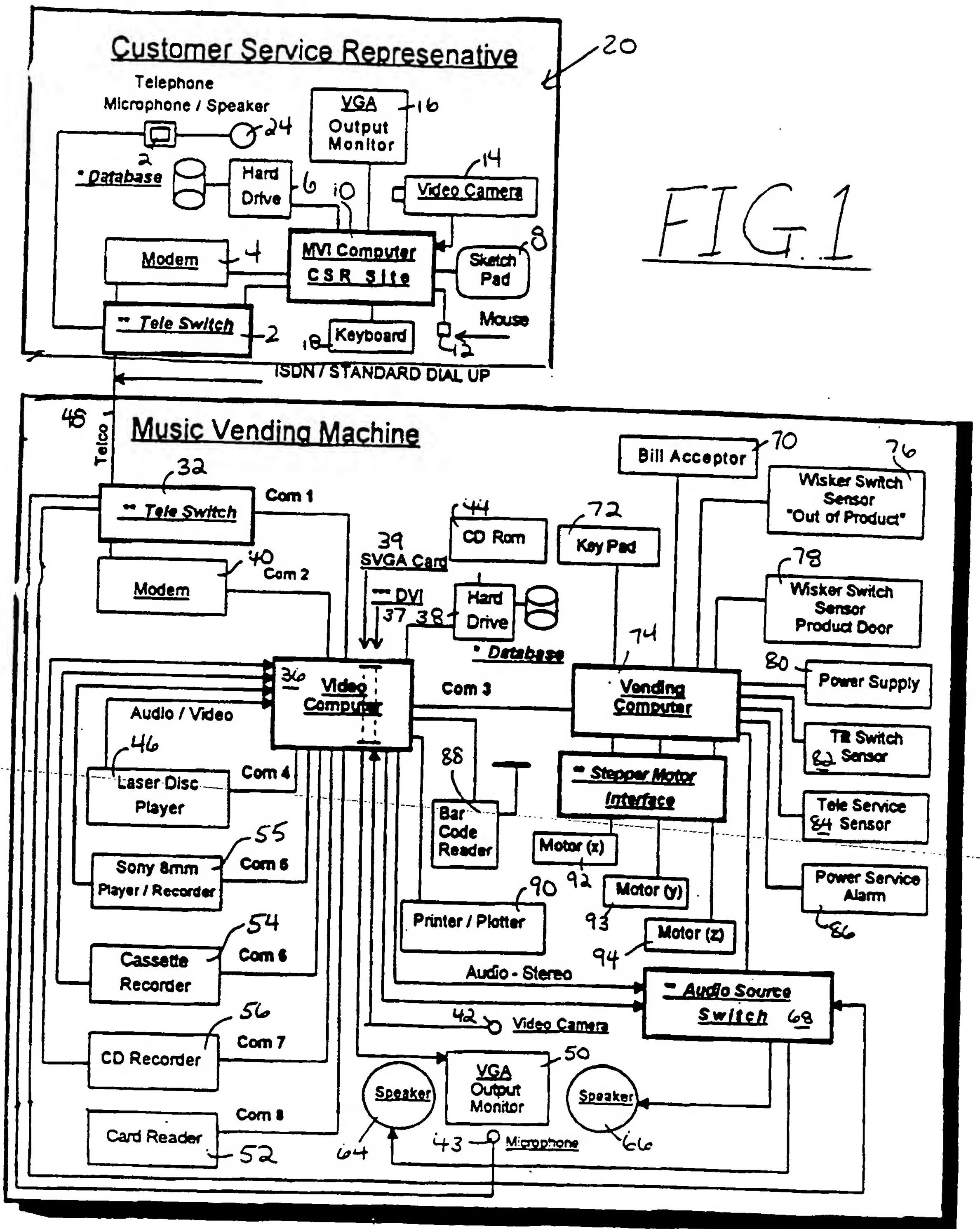


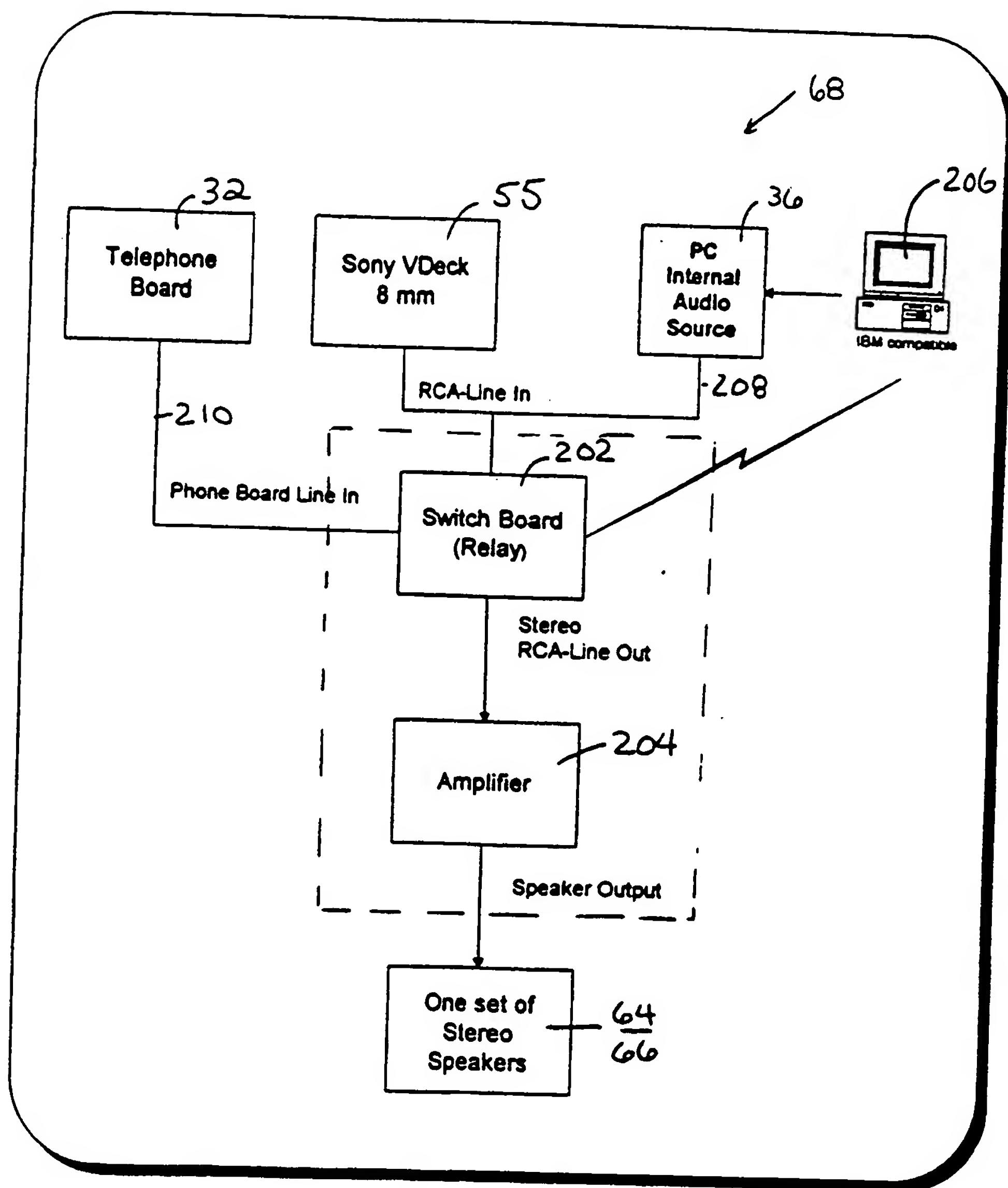
FIG. 2

FIG 3A

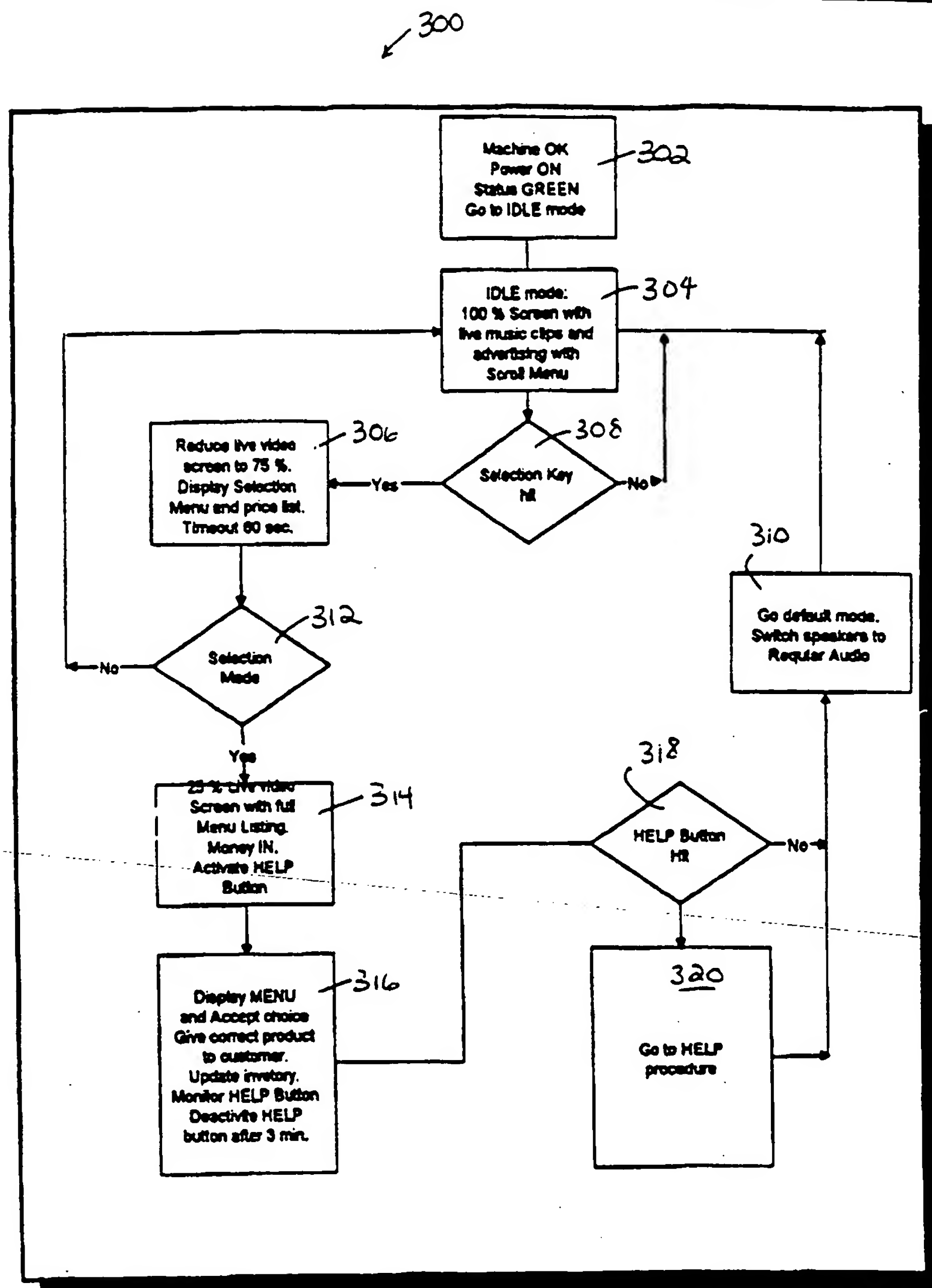


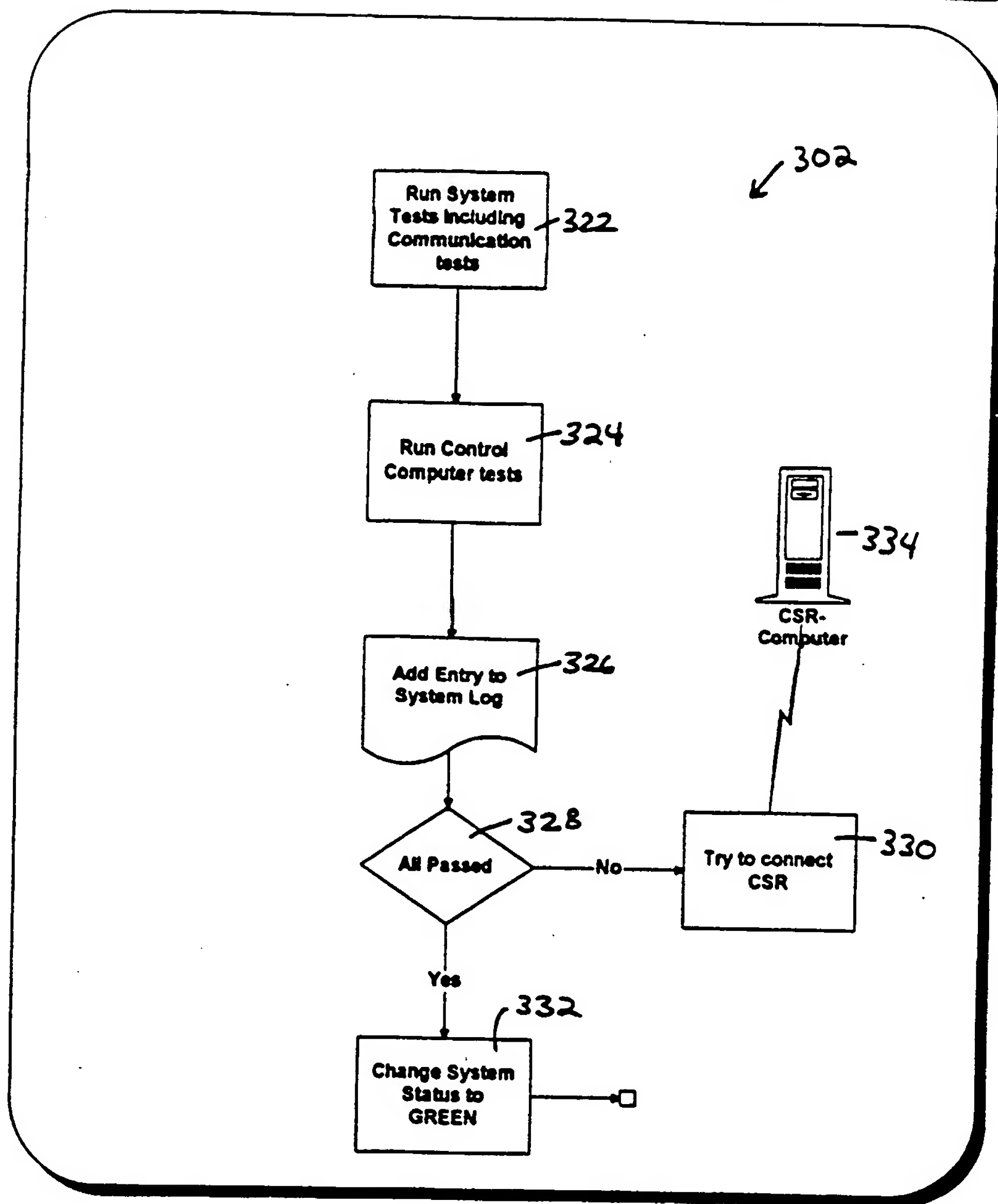
FIG. 3B

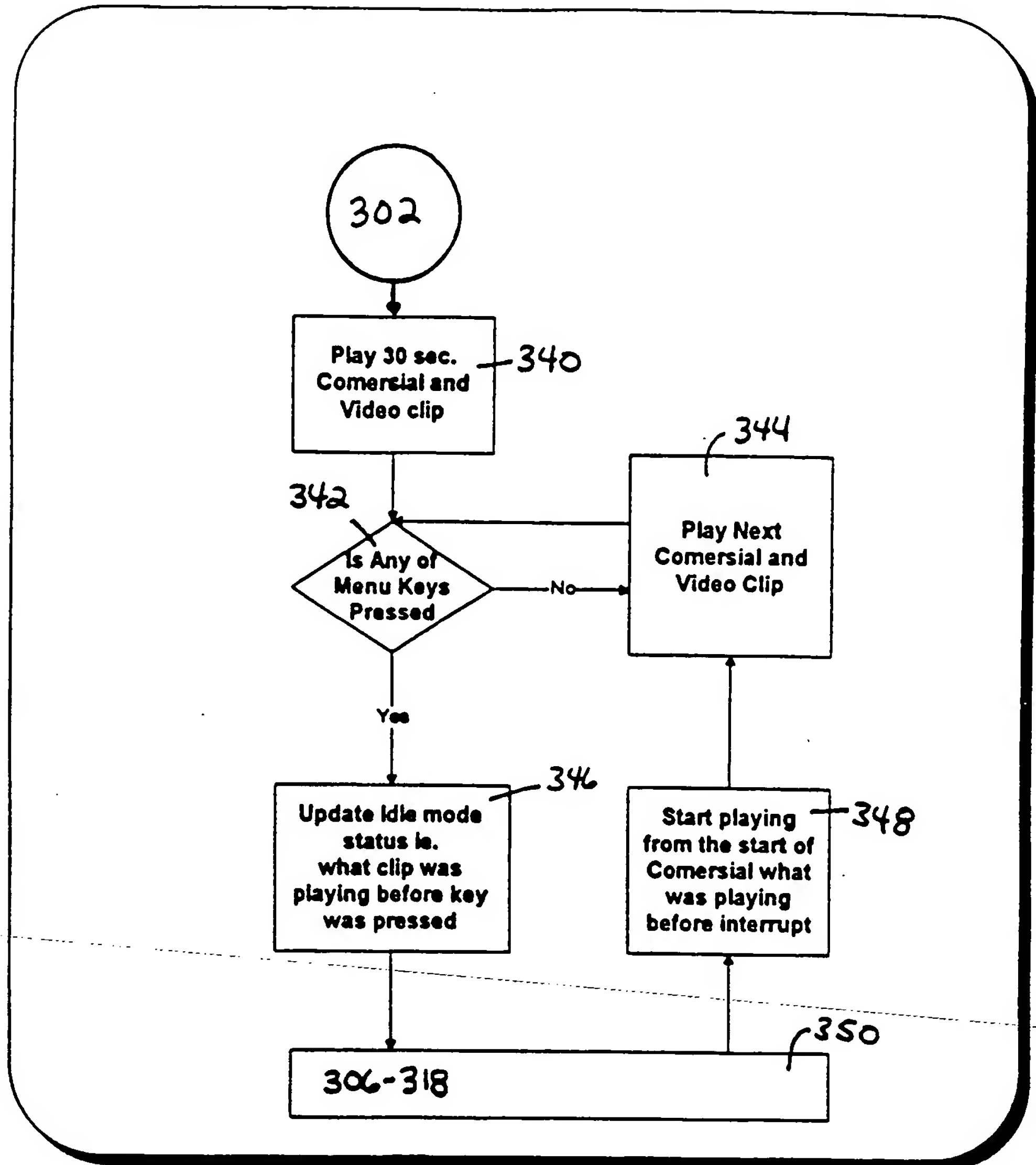
FIG. 3C

FIG 3D

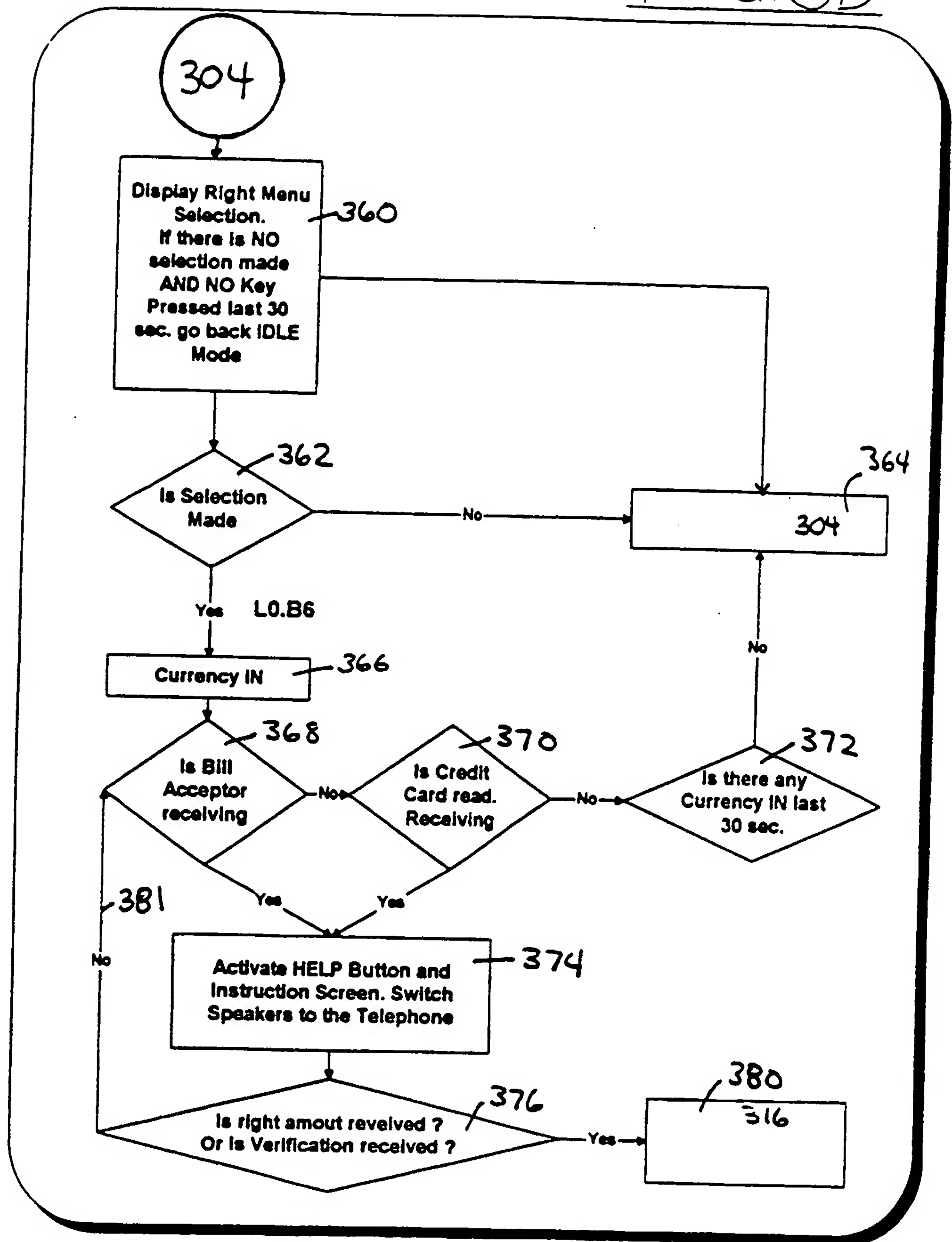




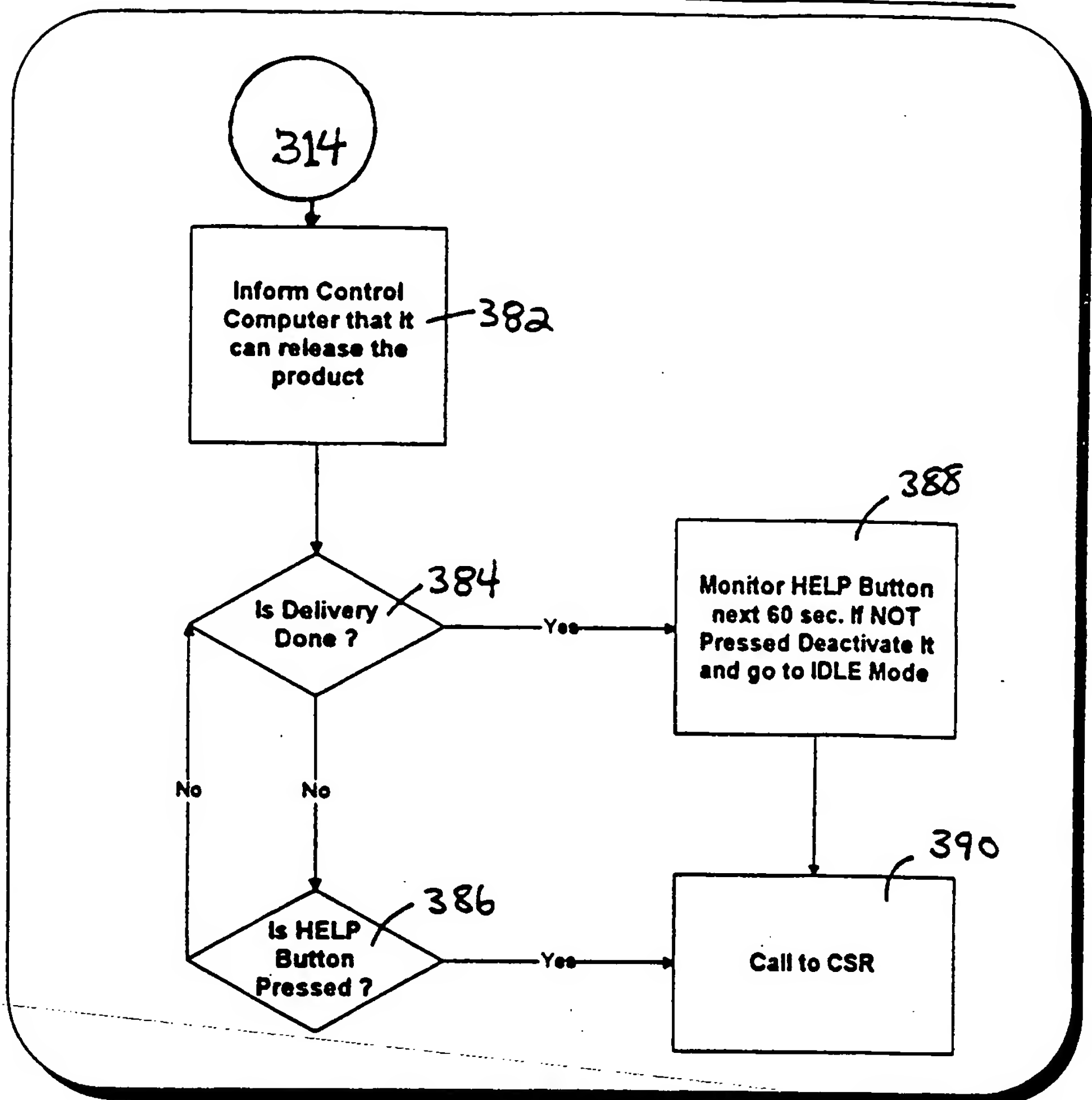
FIG. 3E

FIG. 4

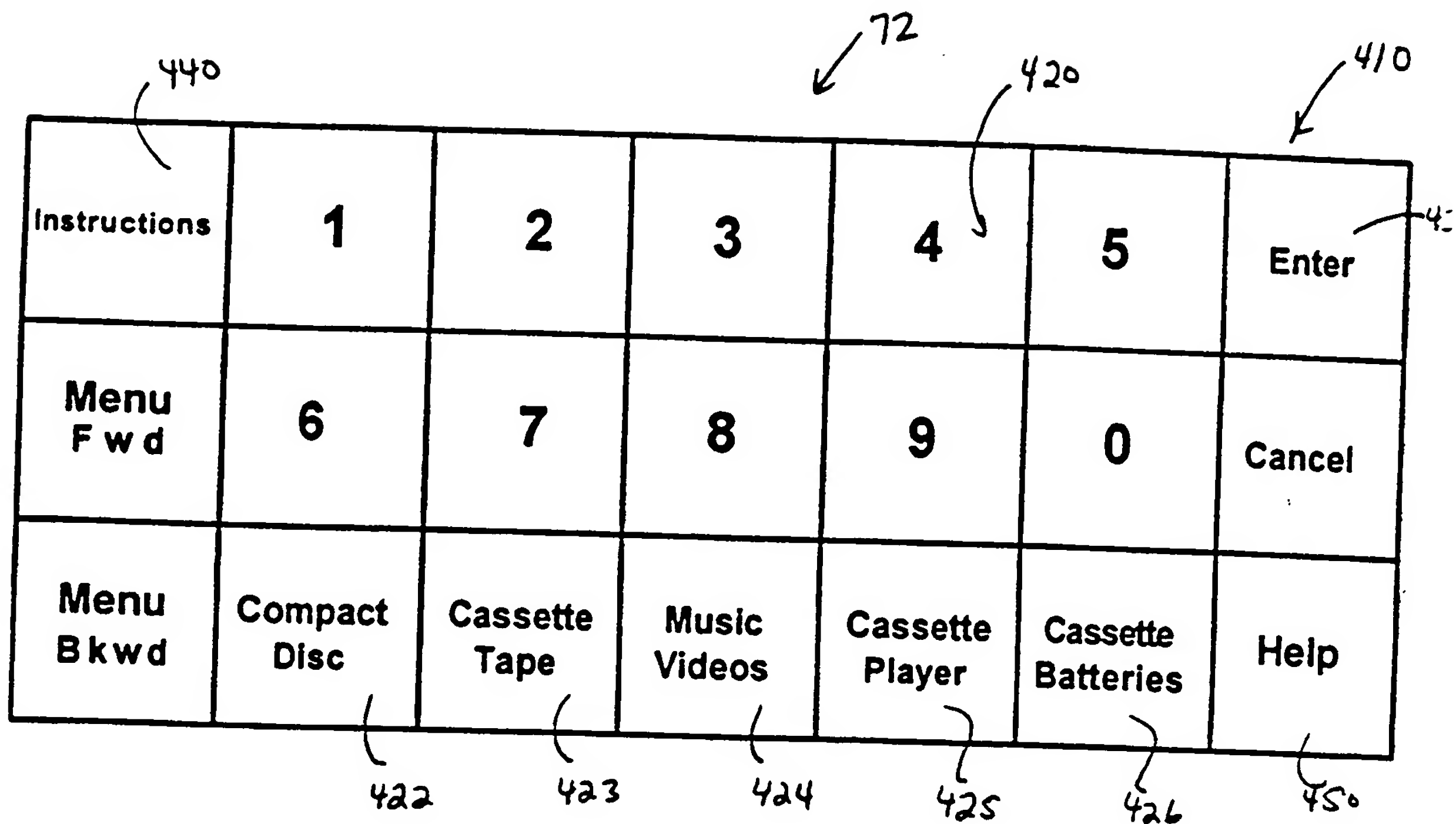


FIG. 5

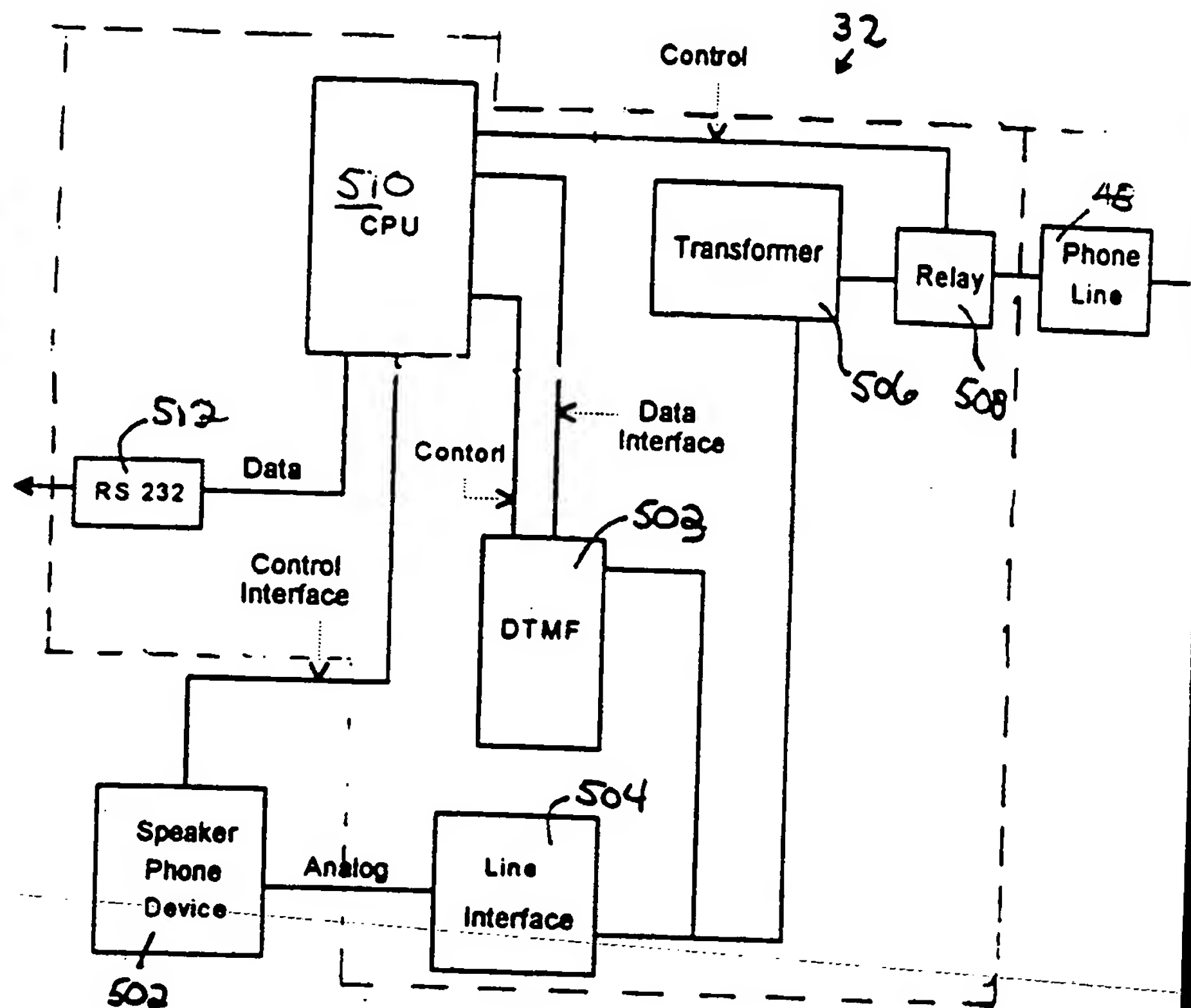


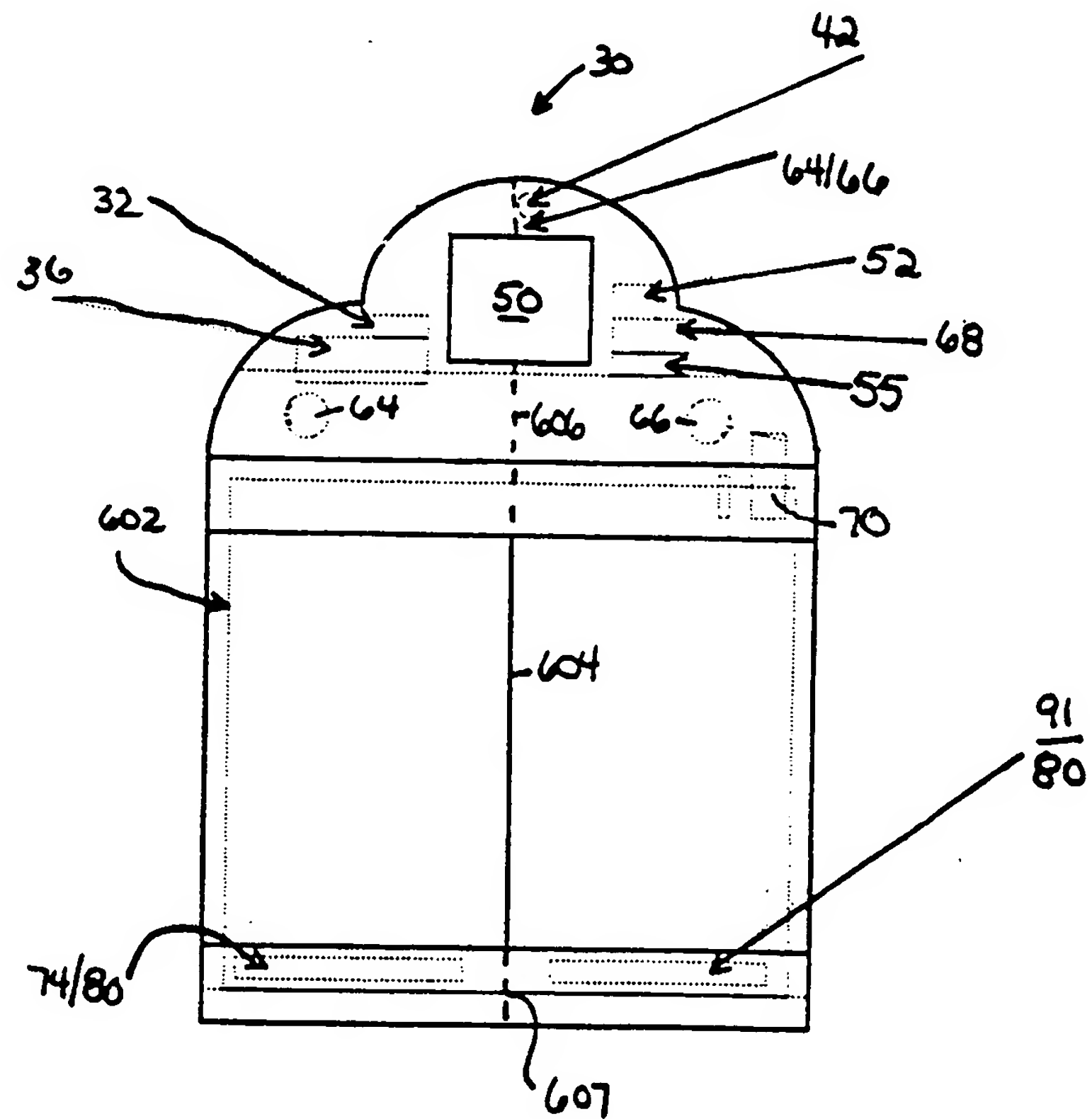
FIG. 6

FIG. 7C

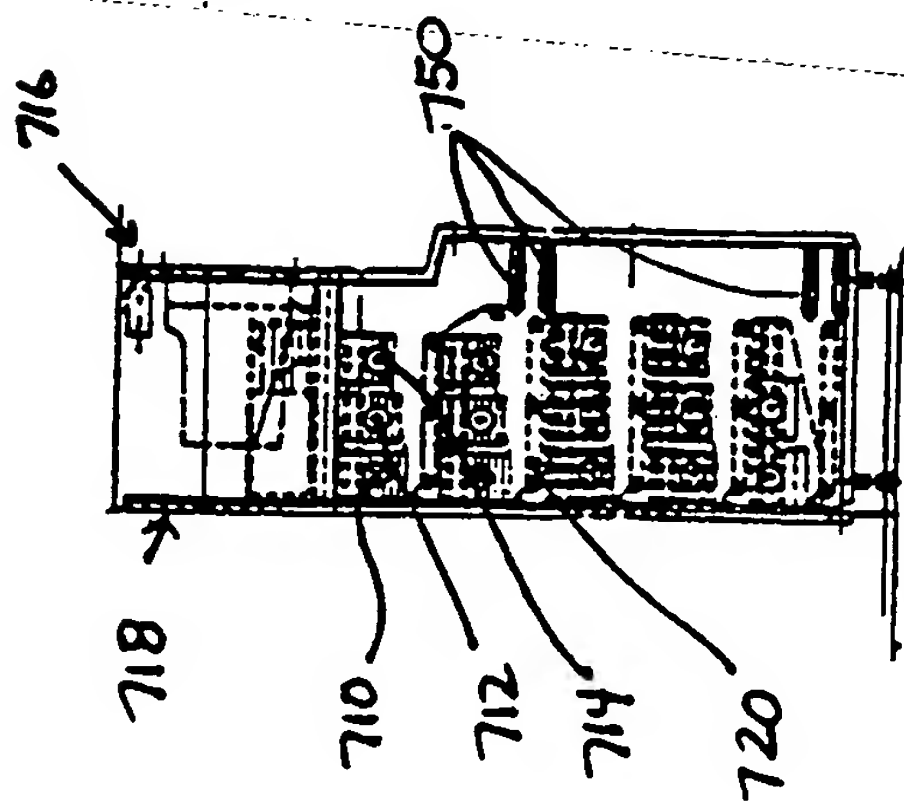


FIG. 7B

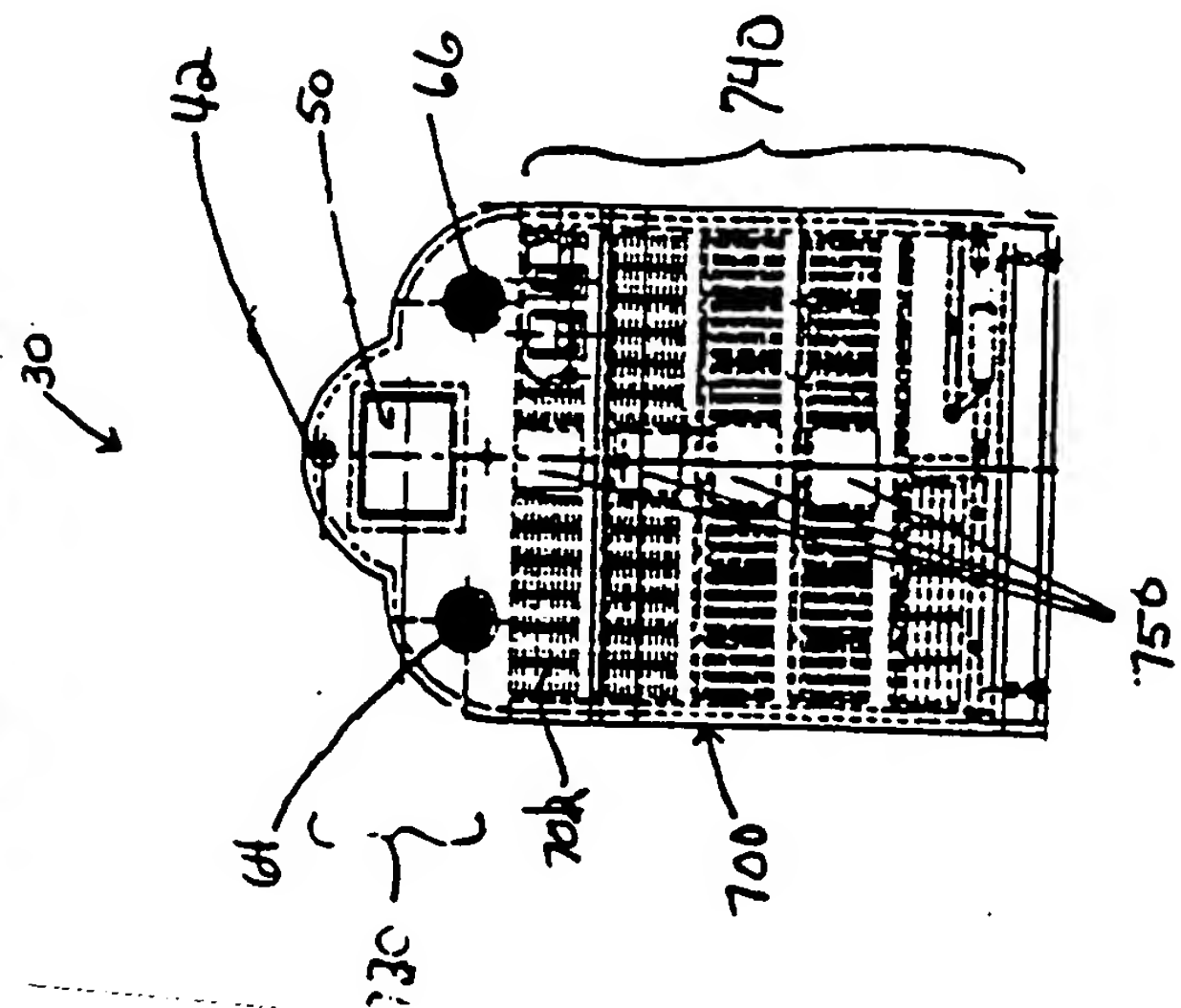


FIG. 7A

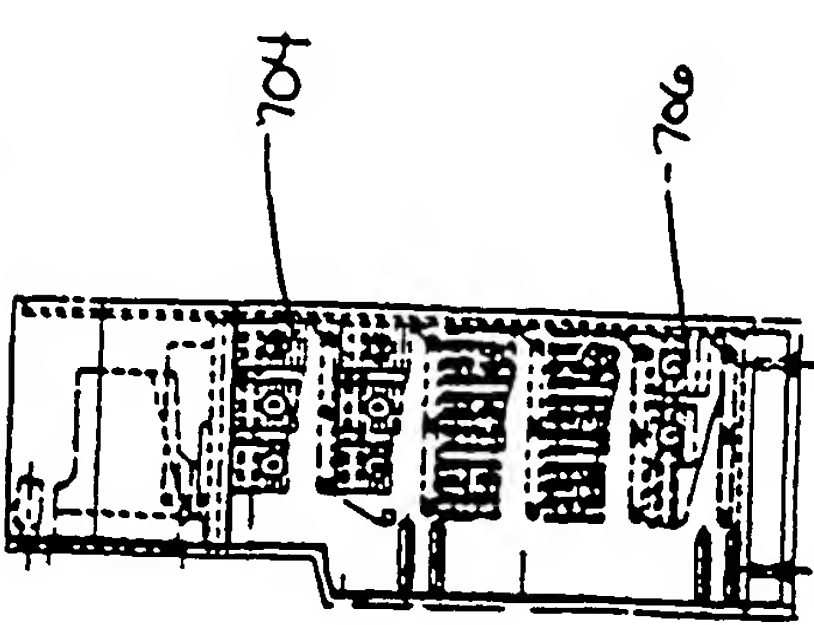


FIG. 8C

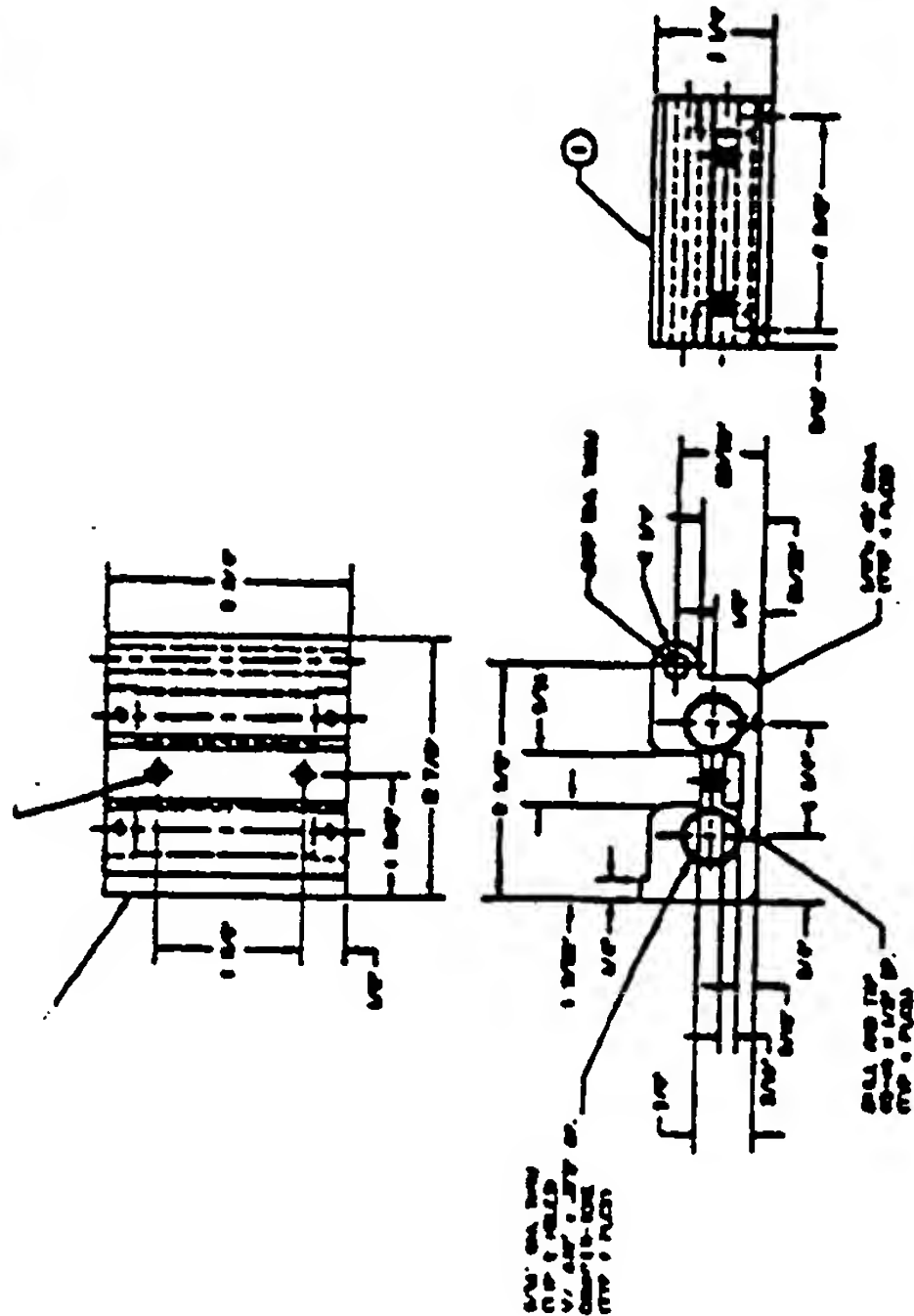


FIG. 8A

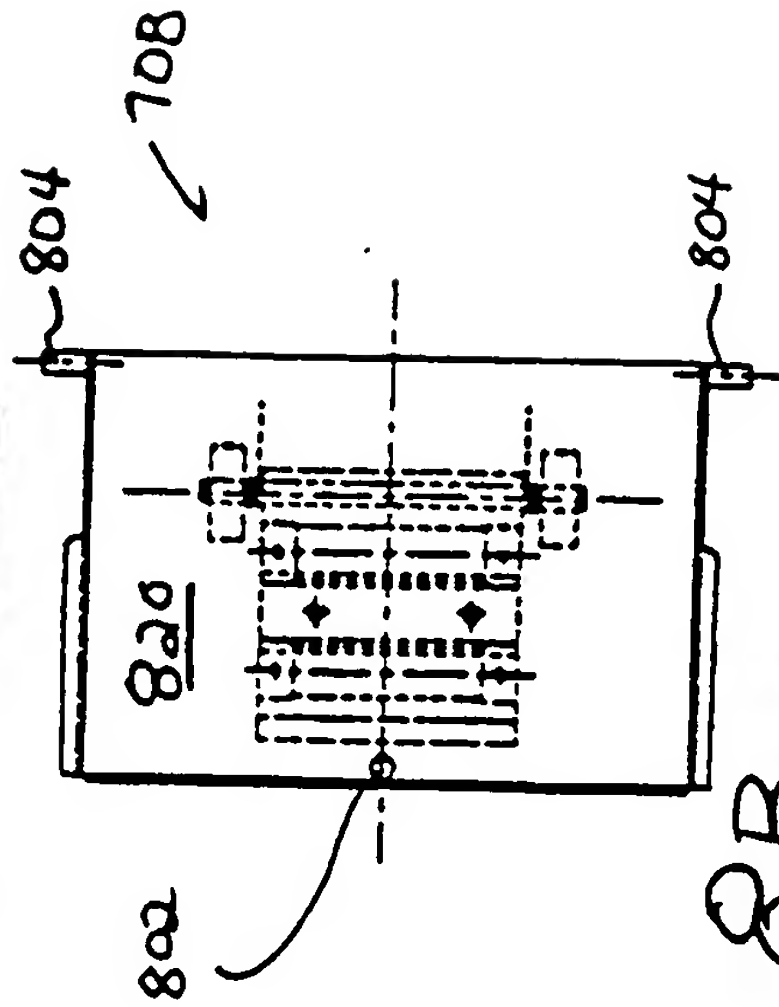
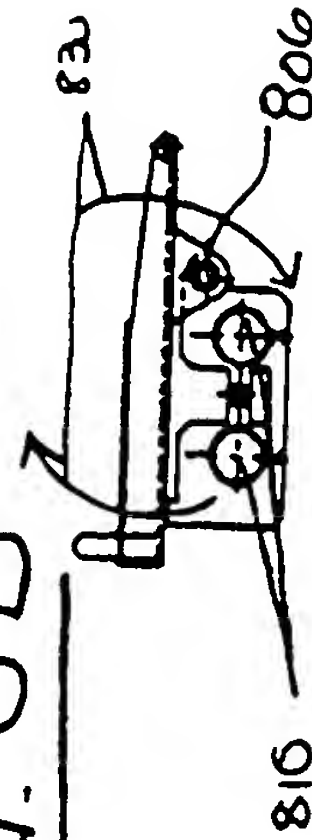


FIG. 8B



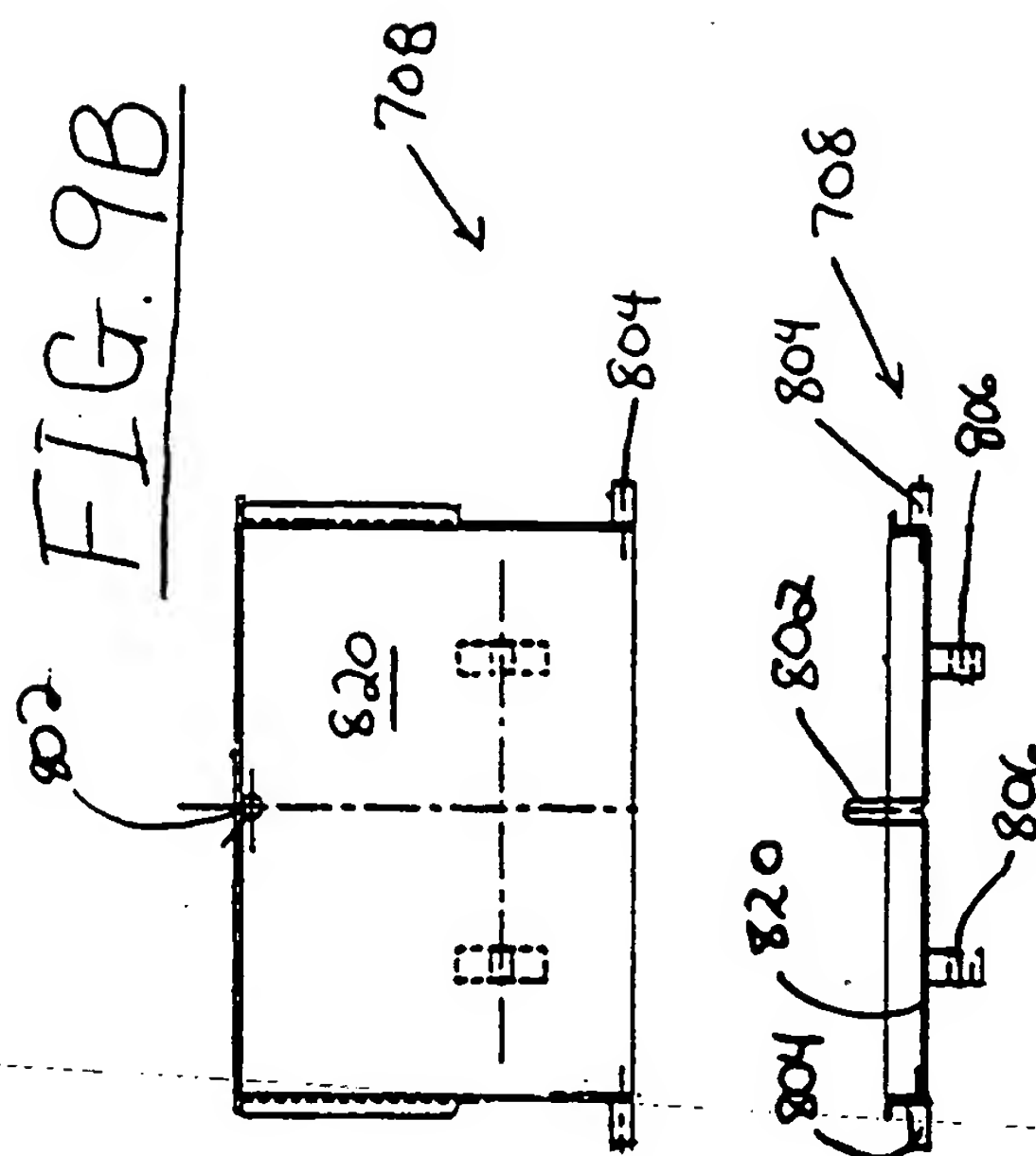


FIG. 9A

FIG. 10A

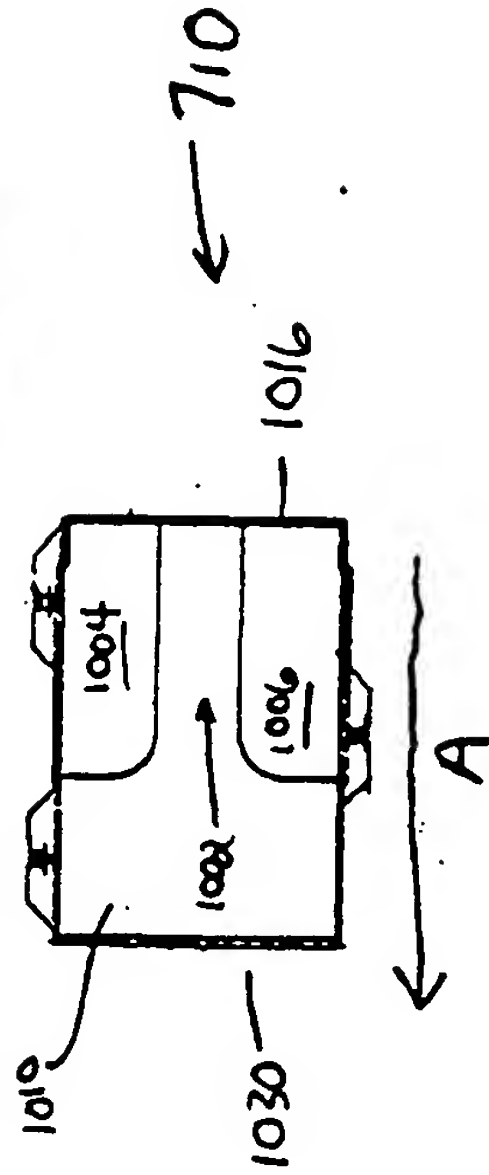


FIG. 10C

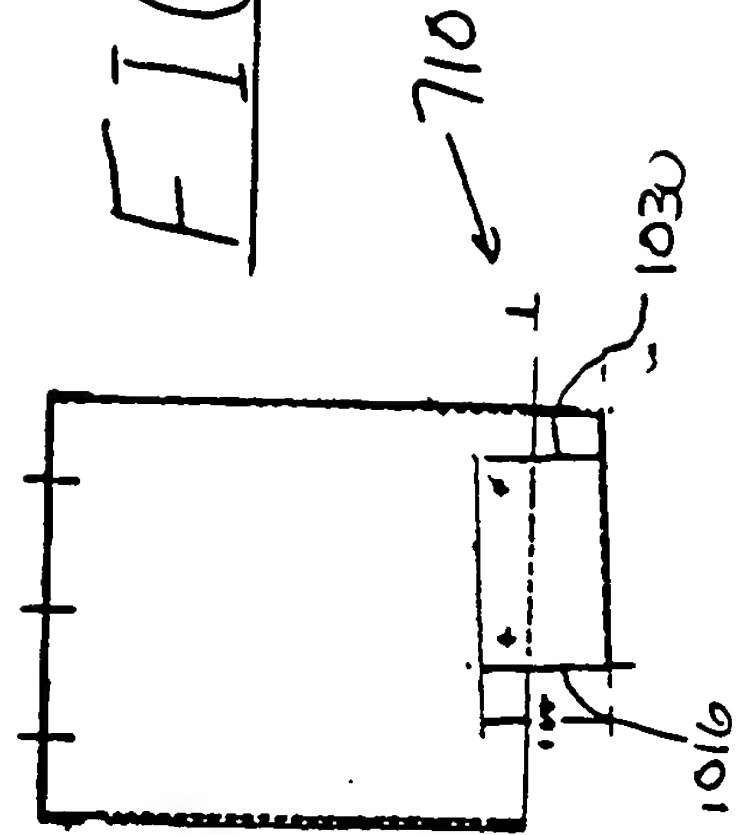


FIG. 10B

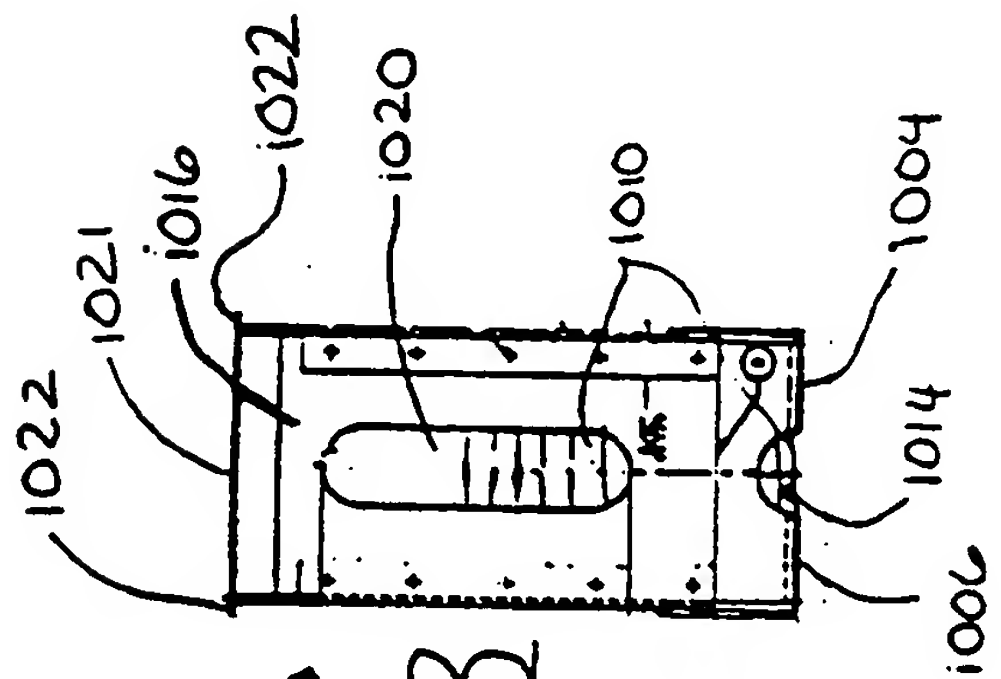




FIG. 11B

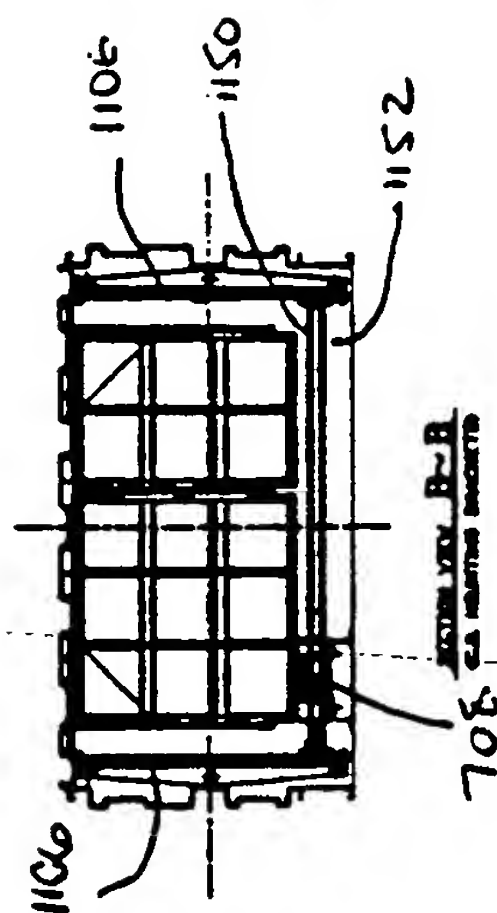


FIG. 11C

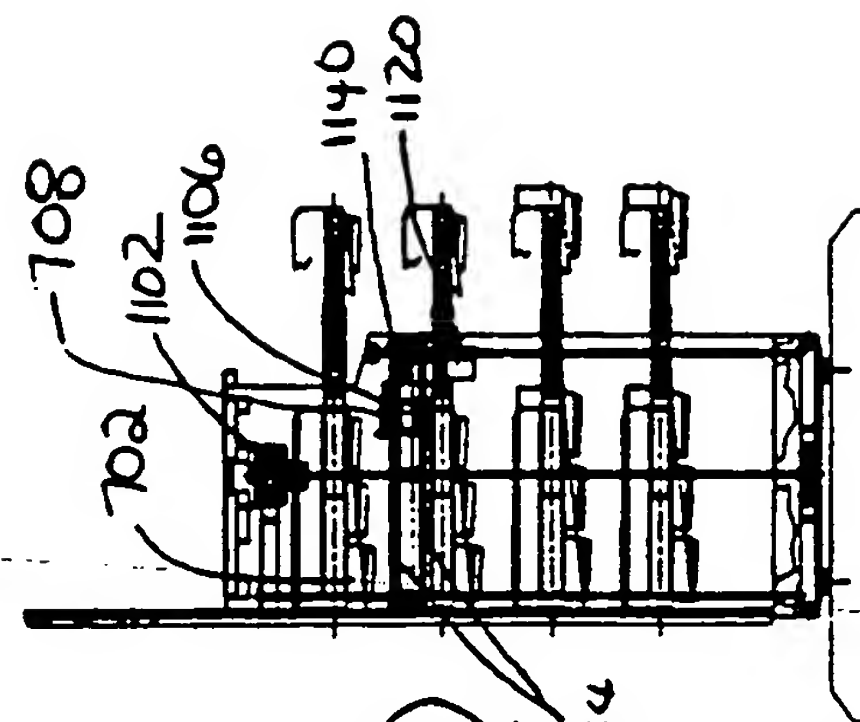
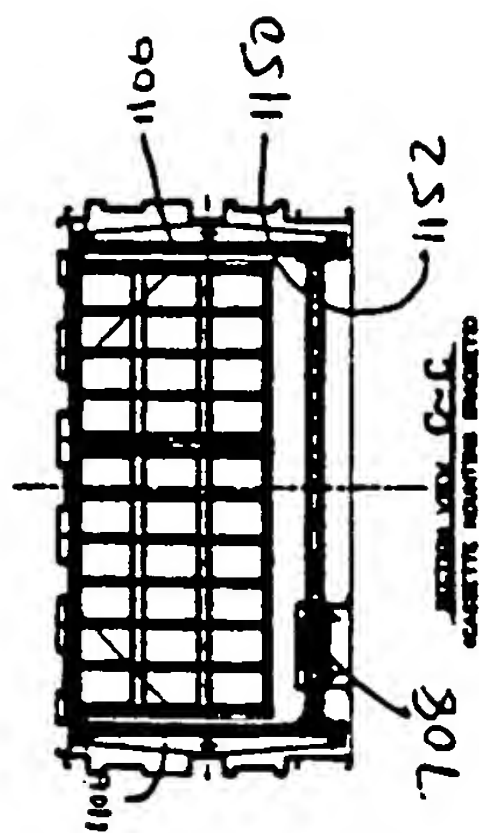


FIG. 11D

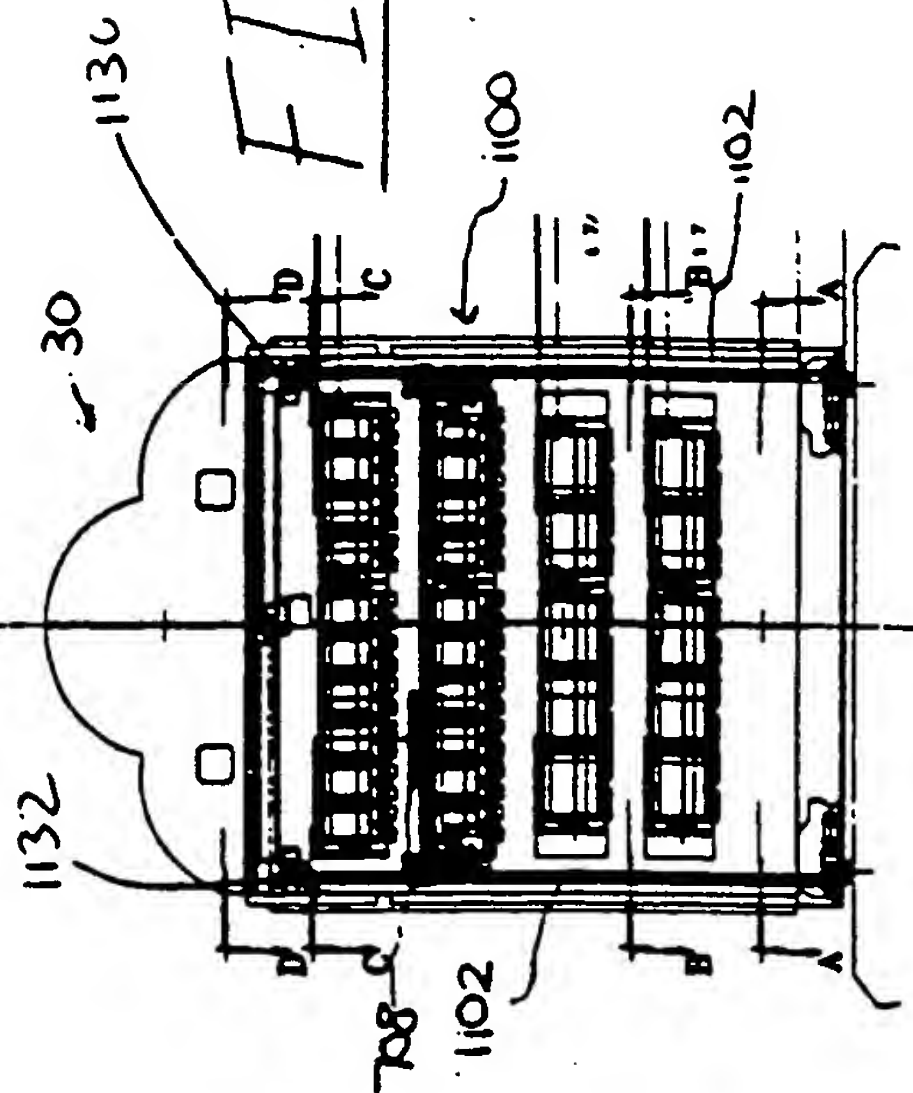


FIG. 11A

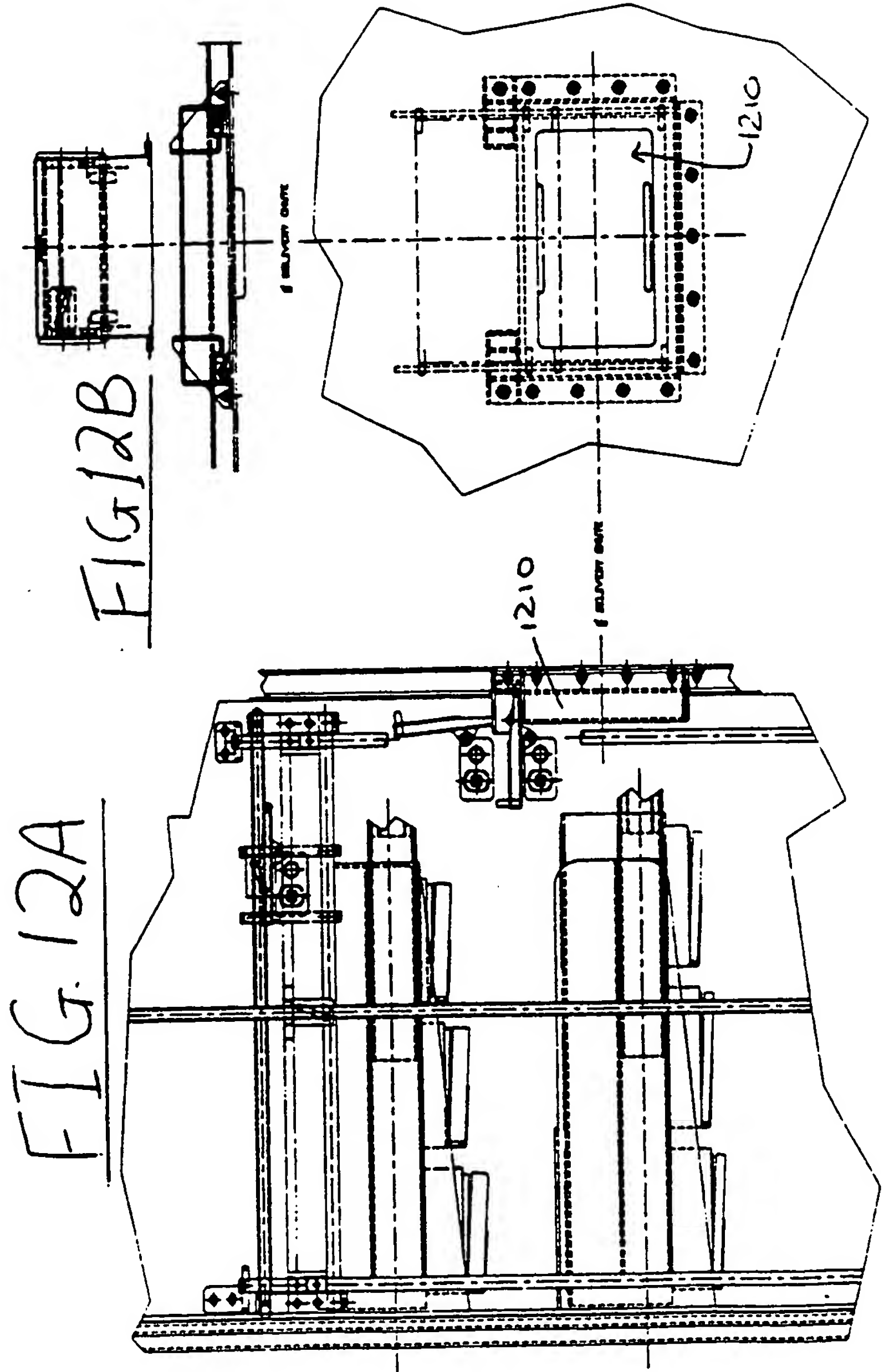


FIG. 12A

FIG. 12B

FIG. 12C